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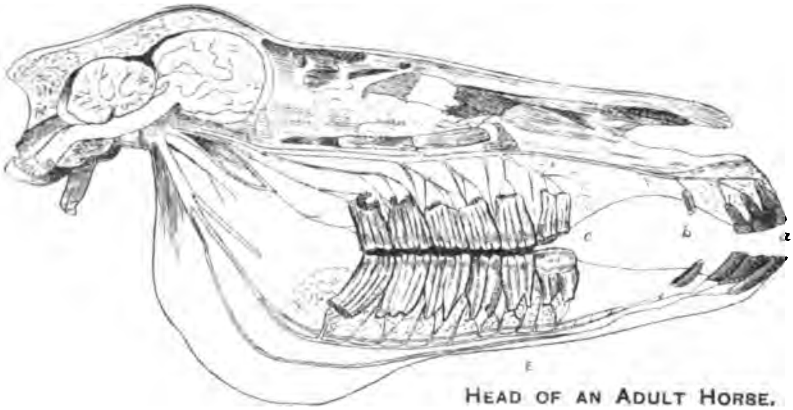
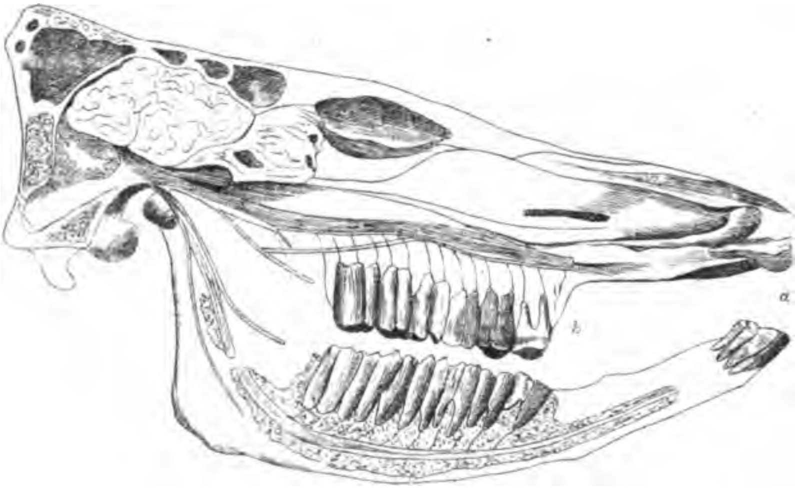
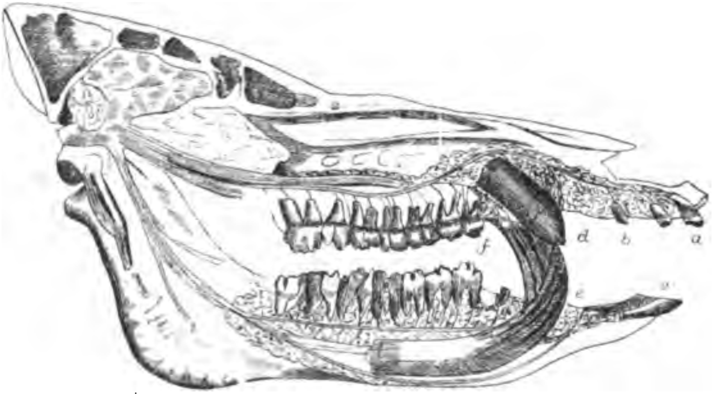


HEAD OF AN ADULT HORSE.



HEAD OF AN ADULT OX.



HEAD OF AN ADULT WILD PIG.

VERTICAL SECTIONS OF THE HEADS OF ANIMALS, SHOWING THE TEETH AND NERVOUS SYSTEM.

THE COMMONWEALTH OF PENNSYLVANIA.

AGRICULTURE OF PENNSYLVANIA,

CONTAINING

REPORTS

OF THE

STATE BOARD OF AGRICULTURE,

THE

STATE AGRICULTURAL SOCIETY, THE STATE DAIRYMEN'S ASSOCIATION, THE STATE HORTICULTURAL ASSOCIATION, AND THE STATE COLLEGE,

FOR 1886.

HARRISBURG:
EDWIN K. MEYERS, STATE PRINTER.
1887.

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OFFICE OF PENNSYLVANIA STATE BOARD OF AGRICULTURE,
HARRISBURG, PA., *January 1, 1887.*

To the Honorable Senate and House of Representatives of the General Assembly of Pennsylvania:

GENTLEMEN: In accordance with the provisions of the act of May 8, 1876, and by direction of the Board, I have the honor to herewith submit the tenth annual report of the State Board of Agriculture.

Respectfully yours,
THOMAS J. EDGE,
Secretary.

TENTH ANNUAL REPORT

OF THE

Pennsylvania Board of Agriculture,

FOR THE YEAR 1886.

PENNSYLVANIA BOARD OF AGRICULTURE 1886.

Members Ex-officio.

Hon. R. E. Pattison, *Governor.*
Hon. J. S. Africa, *Secretary of Internal Affairs.*
Hon. J. B. Niles, *Auditor General.*
Dr. E. E. Higbee, *Superintendent of Public Instruction.*
Dr. G. W. Atherton, *President Pennsylvania State College.*

Appointed by the Governor.

	Term expires.
Col. V. E. Piolett,	1887
Col. James Young,	1888
Dr. John P. Edge,	1889

Elected by County Agricultural Societies.

			Term expires.
Adams,	I. Garrettson,	Bigler,	1888
Armstrong,			1889
Beaver,	A. L. McKibben,	Green Garden,	1887
Bedford,	J. E. Noble,	Watertown,	1889
Berks,	J. G. Zerr,	Geiger's Mills,	1889
Bradford,	H. L. Scott,	Towanda,	1889
Bucks,	E. Reeder,	New Hope,	1887
Butler,	H. M. Wise,	Harmony,	1888
Centre,	E. W. Hale,	Bellefonte,	1888
Chester,	Thomas J. Edge,	Harrisburg,	1887
Clarion,	J. F. Brown,	Clarion,	1888
Clinton,	J. A. Herr,	Cedar Springs,	1887
Columbia,	Chandlee Eves,	Millville,	1888
Crawford,	M. H. Oliver,	Conneautville,	1889
Cumberland,	C. H. Mullin,	Mt. Holly Springs,	1888
Dauphin,	G. Hiester,	Harrisburg,	1888
Delaware,	E. Harvey,	Chester,	1889
Erie,	J. C. Thornton,	Avonia,	1889
Indiana,	W. C. Gordon,	Black Lick,	1889
Jefferson,	J. McCracken, Jr.,	Frostburg,	1887
Juniata,	D. Wilson,	Port Royal,	1888
Lackawanna,	H. H. Colvin,	Dalton,	1888
Lancaster,	H. M. Engle,	Marietta,	1889
Lebanon,	C. H. Lantz,	Lebanon,	1888
Lehigh,	J. P. Barnes,	Allentown,	1887
Luzerne,	J. B. Smith,	Kingston,	1888
Lycoming,	D. H. Foresman,	Williamsport,	1888
Mercer,	R. McKee,	Mercer,	1887
Montour,	Thomas L. Clapp,	Limestoneville,	1889
Northampton,	A. D. Shimer,	Bethlehem,	1888
Northumberland,	W. C. Packer.	Sunbury,	1888
Somerset,	C. C. Musselman,	Somerset,	1889
Schuylkill,	J. S. Keller,	Orwigsburg,	1887
Sullivan,	L. B. Speaker,	Hill's Grove,	1888
Susquehanna,	R. S. Searle,	Montrose,	1889
Tioga,	J. W. Mather,	Wellsboro',	1889
Union,	P. Frederick,	Lewisburg,	1887
Venango,	W. Gates,	Oil City,	1889
Warren,	F. R. Miller,	Sugar Grove,	1889
Washington,	J. McDowell,	Washington,	1887
Westmoreland,	F. Y. Clopper,	Greensburg,	1889
Wayne,	N. F. Underwood,	Lake Como,	1889
Wyoming,	N. G. Bunnell,	Vosburg,	1889
York,	W. S. Roland,	York,	1889

OFFICIAL LIST.

President.

Hon. R. E. Pattison.

Vice Presidents.

M. W. Oliver,
D. Wilson,
Dr. J. P. Edge.

Executive Committee.

Hon. R. E. Pattison,
H. M. Engle,
R. McKee,
J. A. Herr,
G. Hiester,
J. McDowell,
J. P. Barnes,
E. Reeder,
T. J. Edge, *Secretary.*

Advisory Committee.

H. M. Engle,
G. Hiester,
J. P. Barnes,
T. J. Edge, *Secretary.*

Secretary.

Thomas J. Edge, Harrisburg.

Botanist.

Thomas Meehan, Germantown.

Pomologist.

E. Satterthwaite, Jenkintown.

Chemist.

Dr. F. A. Genth, University of Pennsylvania.

Consulting Veterinary Surgeon.

Prof. R. S. Huidekoper, University of Pennsylvania.

Veterinary Surgeon.

Dr. F. Bridge, West Philadelphia.

Microscopists, Hygienists, and Food Inspectors.

Dr. H. Leffman, Philadelphia,
Prof. C. B. Cochran, West Chester

Entomologist.

Prof. W. A. Buckhout, State College.

Ornithologist.

Dr. B. Harry Warren, West Chester.

Meteorologists.

Prof. I. T. Osmond, State College,
J. L. Heacock, Quakertown

Mineralogist.

Col. Joseph Willcox, Philadelphia.

Geologist.

Prof. J. P. Lesley, Philadelphia.

Stenographer.

Col. H. C. Demming, Harrisburg.

STANDING COMMITTEES, 1886.

Executive Committee.

Hon. R. E. Pattison,
H. M. Engle,
Robert McKee,
J. A. Herr,
G. Hiester,
J. McDowell,
J. P. Barnes,
E. Reeder,
Thomas J. Edge, *Secretary*.

Advisory Committee.

H. M. Engle,
J. P. Barnes,
Thos. J. Edge, *Secretary*.
G. Hiester.

Legislation.

Dr. J. P. Edge,
J. D. Hicks,
J. McDowell,
M. W. Oliver,
C. C. Musselman,
N. F. Underwood,
William Gates,
Thomas J. Edge, *Secretary*.

Silk and Silk Culture.

J. P. Barnes,
W. S. Roland,
Dr. J. P. Edge,
Prof. D. Wilson,
R. S. Searle.

Grasses and Fodders.

N. F. Underwood,
E. Reeder,
J. McDowell,
P. Frederick,
W. R. Shelmire,
J. A. Herr,
Thomas Meehan,
J. C. Thornton.

Forests and Forestry.

William Gates,
D. H. Foresman,
R. S. Searle,
F. R. Miller,
A. J. Ackerley,
W. C. Gordon,
I. Garretson,
H. M. Engle,
E. W. Hale.

Cereal Crops.

J. A. Herr,
M. W. Oliver,
J. C. Thornton,
L. B. Speaker,
W. C. Gordon,
P. Frederick,
J. McCracken, Jr.,
J. G. Zerr,
Col. J. Young,
C. C. Musselman.

Useful Birds.

C. C. Musselman,
Dr. W. S. Roland,
J. S. Keller,
B. Harry Warren,
J. P. Barnes,
M. W. Oliver,
A. D. Shimer,
G. Hiester.

Farm Implements and Machinery.

I. Garretson,
J. A. Herr,
M. W. Oliver,
A. W. Griest,
C. Eves,
C. C. Musselman,
N. F. Underwood.

Wool and Textile Fibers.

J. McDowell,
M. W. Oliver,
John R. Miller,
John McNary,
J. W. Stockdale,
J. W. Axtel.

Farm Stock.

E. W. Hale,
C. C. Musselman,
I. Garretson,
Col. J. Young,
M. W. Oliver,
H. L. Scott.

Fruit and Fruit Culture.

G. Hiester,
H. M. Engle,
D. Wilson,
I. Garretson,
C. C. Musselman,
M. W. Oliver,
W. S. Roland,
N. F. Underwood,
J. S. Keller,
J. A. Herr,
J. McDowell,
E. Satterthwaite.

Dairy and Dairy Products.

E. Reeder,
M. W. Oliver,
C. C. Musselman,
I. Garretson,
H. L. Scott,
C. Eves.

Roads.

J. W. Mather,
J. D. Hicks,
D. H. Foresman,
H. L. Scott,
J. McDowell,
C. C. Musselman,
J. E. Noble,
I. Garretson,
J. A. Woodward,
J. A. Herr,
Thomas J. Edge, *Secretary*.

Fences and Fencing.

Chandlee Eves,
N. F. Underwood,
L. B. Speaker,
M. W. Oliver,
J. D. Hicks,
Thomas J. Edge, *Secretary*.

Apiary and Bee Culture.

M. W. Oliver,
I. Garretson,
William Gates.
J. Shallcross,
Arthur Todd,
G. Prizer,
Mrs. M. L. Thomas,
W. Hottensein,
H. H. Brown.

Water Supply of Farms.

R. S. Searle,
J. C. Thornton,
Dr. J. P. Edge.

EXTRACT FROM AN ACT

To regulate the publication of, apportionment, and distribution of the pamphlet laws, executive and legislative documents, reports of the heads of departments, and the annual and biennial messages of the Governor, approved June 4, 1883.

"Twenty-five thousand six hundred copies of the work entitled the 'Agriculture of Pennsylvania,' in style, manner, and form prescribed by law; six thousand for the Senate, sixteen thousand for the House of Representatives, one thousand five hundred for the Board of Agriculture, five hundred for the State Agricultural Society, five hundred for the Dairymen's Association, three hundred for the Fruit Growers', fifty for the State College, one hundred for the Governor, to be distributed by him, one hundred for the Horticultural Society, fifty for the Librarian for distribution and exchange with the States and Territories, and five hundred for reserve work."

EXTRACT FROM AN ACT

To authorize the printing and binding of the reports of the State Board of Agriculture, and other State agricultural reports.

SECTION 2. The matter for said volume shall be proportioned to the several organizations as follows: To the State Board of Agriculture, two hundred and fifty pages; to the State Agricultural Society, two hundred pages; to the State Dairymen's Association, one hundred pages; to the State Fruit Growers' Association, eighty pages, and to the State College, twenty pages, the whole volume not to contain more than six hundred and fifty pages: *Provided*, That each organization shall compile and arrange its own matter, and that no matter shall be used by either which is not original and legitimate to the organization offering the same.

SECTION 3. For the compilation, arranging, and indexing of said matter, the sum of seven hundred and thirty dollars is hereby annually appropriated, to be paid out of any money in the treasury not otherwise appropriated, upon the receipt of the Superintendent of Public Printing and Binding, that all of the matter has been delivered to him; said sums to be divided as follows: To the State Agricultural Society, two hundred and fifty dollars; to the State Dairymen's Association, three hundred and fifty dollars, and to the State Fruit Growers' Association, one hundred and thirty dollars; and that each organization shall deliver the whole of its report in manuscript to the Superintendent of Public Printing and Binding on or before the first day of November of each year.

SECTION 4. That the State Board is hereby authorized to publish, in pamphlet form, quarterly reports of crop returns from correspondents, epidemic and endemic diseases among domestic animals, experiments, analyses, et cetera, et cetera, the same not to exceed forty-eight pages each, nor more than one thousand numbers. (Approved May 24, 1878.)

PROCEEDINGS

OF THE

PENNSYLVANIA STATE BOARD OF AGRICULTURE.

MINUTES OF THE AUTUMN MEETING.

Held at Bloomsburg, Pa., December 2d and 3d, 1885.

Wednesday, *December 2, 1885.*

Board called to order at 9.30, A. M., by Hon. R. E. Pattison in the chair.

By a call of the roll of members, the following were found present: Hon. R. E. Pattison, Dr. J. P. Edge, Col. V. E. Piollet, and Messrs. Garretson, Patterson, Zerr, Reeder, Herr, Eves, Oliver, Hiester, Colvin, Engle, Barnes, Smith, Foresman, McKee, Sechler, Shimer, Musselman, Keller, Frederick, Gates, Underwood, and Secretary. Later in the session, Messrs. Atherton, Hicks, McDowell, and Speaker were present.

The Chair named Messrs. Dr. Edge, Reeder, and Barnes, a committee to receive and report upon the credentials of members and delegates.

Reports of standing and special committees having been called for, Mr. Reeder of Bucks, on behalf of the special committee appointed to represent the State at the twelfth annual convention of the National Cheese, Butter, and Egg Association, at Chicago, presented a full report of the proceedings of that body; on motion of Mr. Smith, seconded by Mr. Musselman, the report was accepted, and ordered entered on the minutes as a portion of the proceedings of the meeting.

The Committee on Credentials presented the following report:

We find that the following delegates are present with proper credentials:

Light Street Grange, No. 31.—Joshua Hartzel, J. H. Hartzel, Samuel Hartzel, David Stroub, and Elizabeth Brown.

Valley Grange, No. 52.—Ezra Eves, P. B. Eves, T. C. Wilson, F. B. Masters, and Rachel Young.

Sugar Loaf Grange, No. 105.—W. L. Harlinger, C. A. White, and C. L. Kite.

Rohrsburg Grange, No. 108.—Charles Kester and W. W. Parker.

Columbia County Pomona Grange, No. 5.—R. G. F. Khink and F. E. Brockway.

Montour Grange, No. 792.—D. P. Deil and Michael Breakbill.

Catawissa Grange, No. 216.—M. Hartman, Samuel Fisher, and Susan Martin.

Bloomsburg Grange, No. 322.—Eli Barton, John Yerdon, and B. F. Gardner.

North Abington and Glenburn Farmers' Club.—J. W. Tiffany and H. W. Northrup.

Columbia County Agricultural Society.—Freas Fowler, C. L. Sands, and Baltis Sterling.

Pleasant Valley Farmers' Club.—John Hoffa.

Pomona Grange, No 5.—J. B. Patton, G. W. Supplee, and W. J. Martin.

The committee also reported that F. Y. Clopper presented the proper credentials as a member of the Board from Westmoreland county, and that he was entitled to his seat as such.

A number of other delegates were present without credentials.

On behalf of the Columbia County Agricultural Society and the citizens of Bloomsburg, Rev. D. J. Waller welcomed the Board as follows:

It becomes my very pleasant duty, sir, and my privilege, in the name of my fellow-citizens of Bloomsburg and Columbia county, to express to the members of this Board, especially to His Excellency, the Governor of the Commonwealth of Pennsylvania, *ex-officio*, of the State Board of Agriculture, and to say that we cordially welcome them as representatives of the Commonwealth of Pennsylvania to this classic ground. Campbell wrote:

"On Susquehanna's side fair Wyoming," &c.

I do not know how thoroughly all the members of the Board may be acquainted, or perhaps some of the younger generation of our own citizens, with the fact that we are in that Wyoming. The forty-first parallel of latitude falls just across the river south of the town, and this was part of the original township of Wyoming. The water of the Susquehanna flows through a large extent of that valley, but the geographical bounderies have been changed.

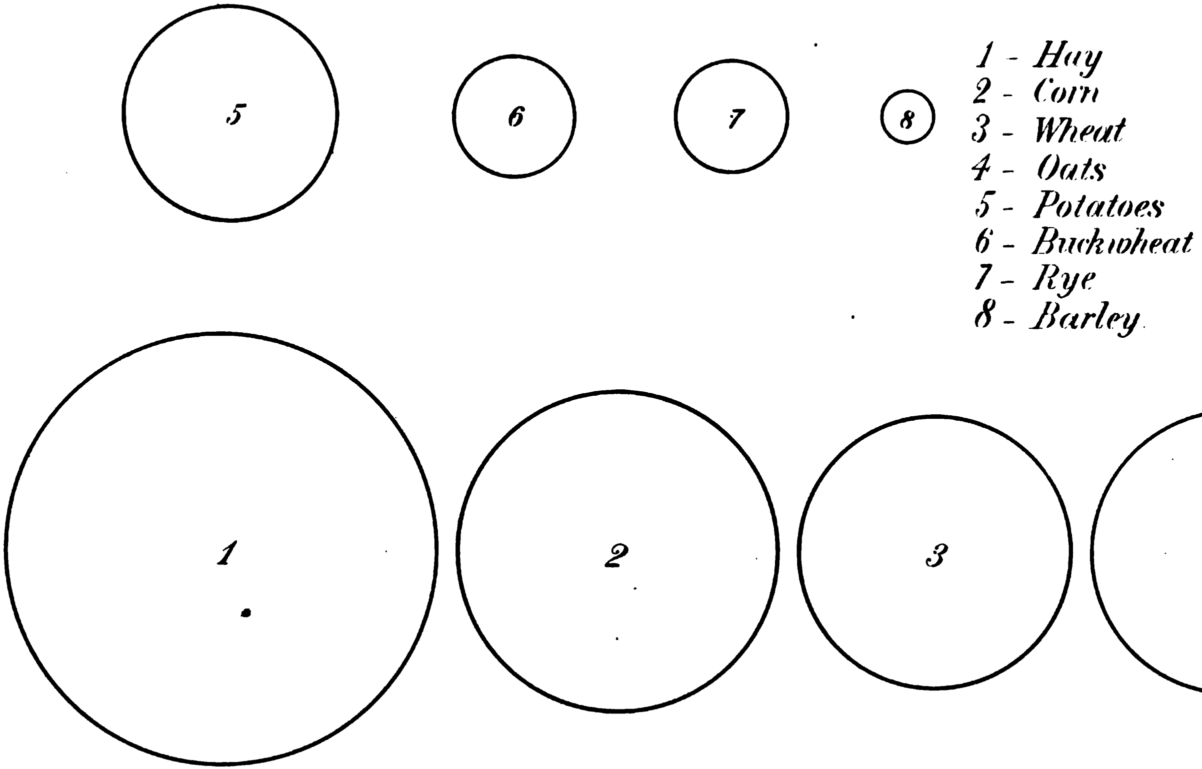
It may be an interesting fact to state that Charles Miner, in his history of Wyoming, states that Colonel James McClure, who was born within sight of the place where we now are, was one of the first three white children born in Wyoming.

We are, sir, upon one of the great highways of the warriors of the ancient times. Fishing creek, emptying from the north into the Susquehanna, and Catawissa creek, emptying from the south, the two only a mile apart upon this north branch of the Susquehanna, constituted, in the early time, one of the great highways of Indian travel from the Great Lakes towards the great shores of the mighty ocean; and the indications of their travel are still found, and the evidences of their sojourn along the banks of these streams are abundant. Some of them have been gathered, and they are yet to be found.

And this, as the county seat of Columbia county, is now a place of great interest to the people dwelling in it, as I believe every other place in Pennsylvania is, as a progressive and as an improving community. It is a peaceful community—but there was a time long ago, and long ago forgotten, when it was far otherwise. We are just upon the borders of that valley which was a ground of strife between two nationalities. How many of our own people have heard of the old enmity and Yankee war, in which not only strife but bloodshed indicated the earnest contention of the New England settler with the claim of those under the grant of Penn, who would assert their authority over the whole territory finally made to the State of Pennsylvania?

We are sorry, your Excellency, that we cannot present the town of Bloomsburg, at the present time, in its best clothes. One of the evidences of its progress you have doubtless seen in the condition of our streets. But it is in the line of progress, and an electric light and steam-heating company is in possession here, and in possession lawfully—for we are a law-abiding people—by the direction of the town authorities. They are preparing us for the enjoyment of more light, and of more genial warmth. Had your meeting been in a more favorable season of the year, we would show you, sir, that we are largely interested in all the subjects that belong to the province of your association.

A few years ago, one of the editors of the *American Agriculturist* came to Bloomsburg, and, calling upon me with a letter of introduction, desired to know something of Pennsylvania mode of farming. As I had just then entered into the fraternity of farmers, after a full generation's period of exclusive devotion to preaching of the Gospel, I was happy to meet him, and explained to him, at his request, the rotation of crops in Pennsylvania, and showed him the process of making and applying lime to the soil as one of the agents of fertilization, and took him over some of the lands of the country here, and gave him letters of introduction to agricultural men further west in the State. How creditable to the other States visited I am not prepared to say; but it was very pleasant to me to receive a letter from him after his return to New York from a journey of some two thousand miles when he said that after leaving this region of Pennsylvania he had gone to two or three or four of the Western States, that he had seen larger fields of grain, and far more extensive, but he had seen noth-



Comparative value of Pennsylvania Crops:
November prices.

ing in the way of agriculture that was, to him, so interesting and so instructive as that which he had seen in this portion of Pennsylvania.

We are here, sir, among the foot-hills of the Alleghenies, and while you see the hills arising around you, it may be well to remember that this country is not all a very rough country; for when the citizens of Bloomsburg desired to obtain a supply of pure water for drinking and other purposes, they could find no elevation within six miles of Bloomsburg that would afford sufficient fall to give them a supply of water, and a down flow to raise it into the upper stories of their houses. I desire to say this because of the impression upon those who may not have been here before, sir, and of my brethren in this Society. I belong, not to the State Board of Agriculture, but to the Agricultural Society of Pennsylvania; and those with whom I have been acquainted in that association have said to me that they have never been here before. I desire them to understand that, under more favorable circumstances, the impression made upon them would be far different than the first glance of this territory now would cause them to make up their minds to. We have here, in addition to the North branch of the Susquehanna, streams coming in from several directions; and to those who can afford time, we can show some of the most varied valleys in the Commonwealth, or the broad Union.

There is one thing that deserves notice here: that there is no portion of the whole United States in which I have ever been that presents, through a larger portion of the year, roads so inviting, so smooth, so well constructed; and yet I know not of a single turnpike gate within thirty miles of Bloomsburg. You will not be called upon to put your hand in your pocket on a cold day, after pulling off your glove, to get a half dime, or a dime, or a quarter to pay for your road way; you get it free, and it is one of those things in which we here rejoice. But our people here are so accustomed to it that I do not feel they half appreciate it.

But sir, as I would not occupy the time that I know is valuable, and interfere with the proceedings of this Society, I would simply call attention to the fact that the people of Bloomsburg are a moral, religious, and largely an intelligent people, and we hope, very earnestly, that the members of this association may allow themselves time enough, not only to discharge their direct duties for which they are gathered here, but to intermingle with our people.

In regard to our churches, we have a variety, according to the tastes and religious proclivities of our people. We have some nine or ten well organized churches, and, I believe, all well supported. An educational institution exists in our town that, perhaps, has some claim, as a State institution, upon the attention of the members of this Board who are officers of the Commonwealth. It was our privilege to welcome here a predecessor of your Excellency, the Governor of the State of Pennsylvania, some fifteen years or more ago, to lay the foundation of the normal school of the Sixth district of the State of Pennsylvania; and very few persons come into Bloomsburg who do not discover that there are ample buildings for the accommodation of such an institution, and for the training of pupils, under the control and legislation of the State of Pennsylvania, for the education of the teachers of the common schools of the State of Pennsylvania. We hope that the officers of this Society will acquaint themselves with the workings of this institution. We have the visits, annually, of the members of the school-board here, who give their attention as officers of the State directly appointed for that duty; and all who are interested in the affairs of the State are certainly interested in the progress, and development, and success of these great institutions of learning, and especially the institutions of learning that are calculated to reach down and mold the primary instruction of the youngest of the children that attend the schools of the Commonwealth.

We hope, Mr. President, that the meetings of your Board will continue to interest the people of Bloomsburg; and, according to the intimations given, that they will consider themselves invited to attend the sessions, and to listen with attention, and those who are members of agricultural associations of any kind, as I understand, are invited to participate in the discussions that arise in this meeting. We trust that your attendance will not only be profitable to us, but that it will be satisfactory and pleasing to yourselves. Our people understand, especially by the interesting report that has been read here this morning, that it is not simply the turning of the furrow, that it is not the swinging of the cradle, or even the reign of the modern improvement that has superseded the cradle; that it is not the simple planting and gathering of our crops that belong to the Agricultural Board of the State of Pennsylvania, but that they have a legal control, to a certain extent, over all that enters into elevating the health, happiness, and the progress of our people.

We, therefore, are deeply interested in all the subjects that may come before this Board; and when we are told here something about the fearful adulterations of food, and perhaps here before we are through, something of the more fearful adulteration of the drugs that are administered to us, and of the nostrums that are spread before us, we can understand that we are interested, as individuals and as a community, in furthering the interests of this association, that are committed by the laws of the Commonwealth especially to its care and studious attention under the direction and management of the Supreme Executive of the State of Pennsylvania. [Applause.]

On behalf of the Board, Governor R. E. PATTISON replied as follows:

DR. WALLER, CITIZENS OF BLOOMSBURG, AND MEMBERS OF THE AGRICULTURAL SOCIETY OF COLUMBIA COUNTY: There was once a Governor of a Western State who, in commenting upon the relation of the public officer to the people, declared that all public officers are servants of the people. And he held that the Governor is the "principal servant." I stand somewhat in that relation to the State Board of Agriculture of Pennsylvania. I am called upon to do their bidding on such pleasant occasions as the present. If I am the "principal servant," then I must see to it that I set the example of obedience to the commands of the Board, and, however much I may be inclined to excuse myself, submission to their will, as the example of obedience, must always command me.

On behalf of the Board, I gladly return thanks to the citizens of this place for the kind words of welcome with which we have been greeted. I only voice their sentiments when I say that the Board rejoices in the abundant marks of progress, and in the growth of this community so evident around us. I refer not only to the material prosperity that is presented to view in the buildings adjoining your town—your churches, school-houses, public edifices, stores, and residences—but also to the fact that in intelligence and public spirit there are evidences here of a greater and more permanent growth—a building for the future—for as you have taken the place of your fathers, so your children will come after you, and as a foundation was laid for you, so you are broadening that foundation for them. The development of mind is an eternal thing. What is evolved is lasting in its influence. It is like a building "not made with hands." And so we sincerely rejoice with you in that kind of mental development which distinguishes the people of this section of our State.

I am impressed with the fact that the Indian made no mistake when he selected for his favorite hunting grounds the beautiful Wyoming valley. In looking over the history of the State, I discovered what had not occurred to my mind before, that wherever the Indian planted his wigwam and marked off his hunting ground, there was not only fertility of the soil, but there was the richest and healthiest of sections. Truly, he was wise in his day and generation. Over in the valleys of Bedford county, comparatively short and narrow, yet opulent in soil and rich in productiveness, the Indian discovered the famous waters of that region a hundred years ago, and thither thousands have gone during all these subsequent generations to enjoy them. There he gathered with his fellows, and derived the benefits which those waters yield, and there are still to be seen a variety of herbs and nuts, and other vegetation taken there from many points of our common country by the Indian. And so the Indian, with his natural foresight, settled in this section of the State where we stand to-day. This county, reaching from the Susquehanna over to the counties of Lycoming and Sullivan, is rich and fertile to this day. Doubtless, this feature may have been one of the causes of the many sanguinary conflicts which occurred between the tribes and others for its possession.

Here, too, if I recollect aright, lived Tammany, the great Indian chief, who gathered his tribe of Leni-Lenapes and marshalled his warriors. That was an organization of the primitive times, which has since been distinguished by a powerful political society of our own day, in assuming as its title the name of "Tammany." It has its branches in many parts of the country, and on the roll of the original society appears the names of some of the descendants of these same Indians. The brave Logan, another prominent chief, was once a resident of this section. Here he pitched his tent and pursued his game. Logan was distinguished as one of the most remarkable of natural orators, and many of his eloquent utterances are still preserved in the literature of the schools. It was here, also, that there lived a woman who combined in herself a mystic character. I refer to the celebrated Madam Montour, after whom Montour county is named. Her individuality appears to have been confounded with that of two other women; but she is recalled as one of the most interesting persons connected with the history of Pennsylvania. She was well known and highly appreciated by the best social circles of old Philadelphia. There she was a welcome and frequent guest, and many reminiscences of her life are related in the families by which she was entertained in the olden time. Her judgment and tact were far above ordinary. Familiar with the red man's language, she often acted as interpreter between him and his white brother, and, by her great influence over the savage nature of the one, she frequently saved the other from the deadly knife and murderous tomahawk.

Many other interesting events connected with the history of this section might take up our time to our profit; but we are here for other purposes. While these matters are pleasant to recall, yet we must say that in the hearty welcome which has been extended to us to-day, we see that which is greater than anything the history of the past offers. We stand in the midst of modern intelligence and prosperity, and we rejoice in the faith that the future holds in its embrace, for you and your children, a still higher civilization.

The agricultural board bears a close relation to you, for this is an agricultural region, as well as one devoted to mining and manufactures. As you have said, sir, the line of industry this Board represents lies at the very foundation of our general welfare. The food we eat, the clothes we wear, and the comforts we enjoy, may be traced directly to it. The Board is composed of gentlemen from all parts of the State. They come from the north, south, east, and west. And they come not only for the transaction of their regular business, but to impart to you, through their proceedings, such information as you will do well to heed. They do not bring you mere book knowledge. That is within your reach as well as theirs. But they come with the practical knowledge that is obtained at the plow, in the field, and amid the rich gatherings of the harvest. They come from the laboratory, the workshop, and the market, and while they present the fruitage of their observation and study, they will be anxious to learn from you whatever it may be in your power to contribute toward the great object they have in view, that is, the higher advancement of the agricultural interests of Pennsylvania. I sincerely trust, sir, that when our session ends, it will be found that on both sides we have pitched our common tent "a day's march nearer home."

Again, sir, on behalf of the State Agricultural Board, I tender their thanks for the kindly welcome you have extended in the name of the citizens of Bloomsburg and the Columbia County Agricultural Society.

On motion of Dr. J. P. EDGE, it was resolved that, at this session, no member should speak more than five minutes at one time, nor more than once upon the same topic, until all wishing to speak had an opportunity to do so.

On motion, J. R. TOWNSEND of Bloomsburg then read an essay on "Grapes for the Farm Garden," the subject-matter of which was discussed by Messrs. Piollet, Townsend, Engle, Herr, Hiester, Smith, and Keller.

On motion of Mr. SMITH, seconded by Mr. FREDERICK, Dr. JAMES CALDER then read an essay on "Quince Culture," which was discussed by Messrs. Smith, Oliver, Engle, and others.

Mr. HIESTER, member from Dauphin, then read an essay on "Fruits for Family Use," which drew out discussion from Messrs. McDowell, Hiester, Walter, Herr, and Zerr.

On motion of Mr. ENGLE, seconded by Mr. CLOPPER, adjourned until 2, P. M.

WEDNESDAY AFTERNOON, *December 2, 1885.*

Board called to order at 2, P. M., by Hon. R. E. Pattison in the chair.

Discussion of Mr. Hiester's essay on "Fruits for Family Use" resumed, and participated in by Messrs. Dr. Edge, Piollet, Barnes, Engle, Hiester, Herr, and Frederick.

On motion, WILLIAM FAIRWEATHER of McLane, Erie county, read an essay on "The Best Breed of Dairy Cattle," which was listened to with more than usual interest, and was discussed by Messrs. Piollet, Reeder, Oliver, Fairweather, Smith, Northup, Engle, Dr. Edge, Musselman, Hicks, Harvey, McDowell, Colvin, Keller, and Secretary.

A telegram having been received from Col. Jameson to the effect that he was unable to be present with his essay on "Pure Bred Horses," on motion of Mr. EVES, Dr. Harvey, member from Delaware, was invited to address the meeting upon the same topic. Dr. Harvey's address was listened to with interest and called out much discussion.

On motion, M. P. LUTZ then read an essay on "Poultry for Profit and Pleasure," which called out discussion from Messrs. McDowell, Tewksbury, Lutz, Harvey, Barnes, Zerr, Smith, Oliver, and Engle.

H. H. BROWN, of Light Street, then read an essay on "Bee-Keeping," when, on motion of Mr. ENGLE, adjourned until 8, P. M.

WEDNESDAY EVENING, *December 2, 1885.*

Board called to order at 8, P. M.

Prof. W. A. BUCKHOUT, Entomologist of the Board, delivered an address on "The Life and Habits of Insects." The lecture was illustrated by large diagrams and drawings, which served to make it plain to all present. This lecture was listened to by one of the largest audiences which has yet greeted the Board.

THURSDAY MORNING, *December 3, 1885.*

Board called to order at 9, A. M., by Hon. R. E. Pattison, President, in the chair.

On motion, the essay of M. W. Oliver, "Experiments in Farming," left over from the afternoon session of the preceding day, was then read, and its subject-matter discussed by Messrs. Barnes, Engle, Underwood, Keller, Little, Smith, Musselman, Foresman, and Secretary.

An essay on "Farmers' Mistakes" was then read by E. M. TEWKSBURY, and was followed by a general discussion of the points of the essay.

By a vote of twelve to ten, it was decided to call up essay No. 3 of the printed programme, and, in accordance with the decision, A. Z. SCHOCH, Esq., then read an essay on "The Best Wheat from the Miller's Stand-point."

On motion of Dr. HARVEY, the regular order of the programme was then taken up, and an essay upon "The Insurance of Farm Buildings" read by SAMUEL NEYHARD of Bloomsburg.

Mr. SMITH then called up essay No. 5 of the programme, and Dr. J. P. Edge of Chester read an essay entitled "The Answer to the Propecy," upon which discussion was deferred until the afternoon session.

On motion, adjourned until 2, P. M.

THURSDAY AFTERNOON, *December 3, 1885.*

Board called to order at 2, P. M., by Hon. C. C. Musselman in the chair.

Discussion of Dr. Edge's essay, "The Answer to the Prophecy," resumed and concluded.

(Governor Pattison then took the chair).

On motion of Mr. SMITH, A. P. YOUNG, Esq., of Millville, read an essay on "How to Bring Up a Worn-out Farm."

Mr. FREDERICK of Union presented the following resolution, which was referred to the Committee on Legislation :

WHEREAS, The winter meeting of the Pennsylvania State Board of Agriculture has been called, and the same published in the *Farmers' Friend*, recognized Grange paper;

And whereas, The Patrons of Husbandry of Union county take interest in the current agricultural questions and agricultural progress of these times; therefore,

Be it by this body of representative farmers unanimously resolved, That, as we look to the duly-constituted State Board for redress of grievance and pioneer effort to correct abuses, we hereby respectfully suggest that the secretary of this convention of delegates to the Union County Council, P. of H., request our county member of the said Board, Mr. Philip Frederick, to bear in kindest greeting and present at the aforesaid Board meeting our friendliest acknowledgments of its very valuable labors in the past, and our reliant and hopeful waiting in relation to the future, and, as all history of reform progress confirms the fact of necessitous tardiness, sacrifice, and step-by-step accomplishment, we, therefore,

Resolve, secondly, That the said Frederick be, and hereby is, delegated as the bearer of the unanimous wish of our convention that some efficient mode of enforcing the statutory laws regulating the manufacture and sale of commercial fertilizers be as speedily as possible secured, and that such legislation be asked for by the Pennsylvania

State Board of Agriculture as shall require the phosphate manufacturers to give the source from which nitrogen in their goods is obtained, and so mark their packages as not to subvert the objects for which the present government in the trade was instituted; and, further, the importance of cotton-seed and linseed meal to our farmers justly demands at the hands of our "law-makers" such statutory protective provisions as will compel manufacturers, venders, and agents to mark the package, barrel, or sack, so as to give the purchaser clear and definite knowledge of the rate per cent. of ammonia and phosphoric acid contained in the said agricultural goods.

(Signed,) S. G. Grove,
E. Shorkley, *Secretary.* *Worthy Master.*

On motion of Mr. Eves, seconded by Mr. Smith, it was resolved that the time for the commencement of the evening meeting, as announced in the printed programme, be changed from 8, p. m., to 7.30, p. m.

Mrs. F. M. Eves of Millville then read an essay on "The Farmer's Family—Past, Present, and Future."

On motion of Dr. Harvey, Mrs. Mary V. Bowman of Berwick read an essay on "The Education of Farmers' Sons and Daughters." These two essays attracted an unusual amount of interest, from the fact that they were the first in the history of the Board presented by lady essayists, and they were listened to with marked attention.

D. J. Waller, Jr., then read an essay on "Industrial Education," which was discussed by a number of members and delegates present.

Col. V. E. Piollet presented the following resolution, which, after partial discussion, was, on motion of Mr. Oliver, seconded by Dr. Edge, referred to the Committee on Legislation:

Resolved, That this Board recommend the farmers of the State to memorialize Congress, in any adjudication of taxation upon imports, to give due consideration to the interests of agriculture, and particularly to avoid all discrimination against agriculture in favor of manufacturing or other interests not more meritorious or deserving of the attention and favor of Government; that it is the opinion of this Board that, along with duties on manufactures, reasonable but substantial duties should be imposed upon wool, hides, eggs, and ores.

On behalf of the Committee on Work of the Board, Dr. G. W. Atherton, chairman, presented the following report:

"This committee, in accordance with the instructions of the Board, at its meeting, October 1, 1885, respectfully submits the following report on the standing committees, and the subjects to be submitted to them:

The list, as given in the last annual report of the Board, with the subjects and the respective chairmen, in the order there given, is as follows:

Legislation.—J. D. Hicks.
Work of the Board.—G. W. Atherton.
Silk and Silk Culture.—John P. Edge.
Fruit and Fruit Culture.—H. M. Engle.
Grass and Grasses of Pennsylvania.—N. F. Underwood.
Forests and Forestry.—W. S. Roland.
Apiary and Bee Culture.—M. W. Oliver.
Dairy and Dairy Products.—E. Reeder.
Useful Birds.—C. C. Musselman.
Cereal Crops.—D. H. Foresman.

Roads.—J. W. Mather.

Wool and Textile Fibers.—J. McDowell.

Fences and Fence Laws.—

(The last-named committee was elected by vote of the Board at the Lancaster meeting, but no chairman was appointed.)

The committee have carefully considered the foregoing list of subjects, and, while it seems already more extended than has proved practically useful for working purposes. they are not prepared to recommend the omission of any of the topics named, without the direct instruction of the Board. On the contrary, they suggest the addition of two important subjects not now expressly provided for, viz: Farm implements and machinery, and farm animals."

Any objection to the present arrangement of standing committees that may prevail among members of the Board is not to be removed by a mere redistribution of subjects. It must be met rather by the adoption of more definite and binding regulations respecting the duties of committees, especially in the matter of making reports. As a practical and practicable beginning in this direction, the committee respectfully submit the following recommendations:

1. That the Executive Committee be required to announce the chairman of the several committees at some time during the first session of the annual meeting of the Board, and each chairman so appointed to announce the other members of his committee before the close of the meeting.

2. That in the failure of such action by either the Executive Committee or the respective chairmen, the then existing membership of the committee continue for the succeeding year.

3. That every committee be required to report in writing at least once a year, unless excused by express action of the Board, and that, in order to avoid undue multiplication of reports at any one meeting, the committees be divided into three groups, corresponding to the annual, the summer, and the autumn meetings, and the groups required to report at these respective meetings.

4. That the following distribution of groups be adopted at present, with the changes indicated in one instance, in the title of the committee:

Annual meeting.—Legislation, Work of the Board, Roads and Road Laws, Fences and Fencing, and Farm Machinery and Implements.

Summer meeting.—Silk and Silk Culture, Forests and Forestry, Useful Birds, Farm Animals, and Wool and Textile Fibers.

Autumn meeting.—Grasses and Fodders, Apiary and Bee Culture, Dairy and Dairy Products, Cereal Crops, and Fruit and Fruit Culture.

5. The committee also recommend a thorough revision of the rules of the Board.

(Signed)

GEORGE W. ATHERTON,
J. P. BARNES,
D. H. FORESMAN,
E. REEDER,
WILLIAM GATES,
THOMAS J. EDGE, *Secretary.*"

December 2, 1885.

Mr. BARNES of Lehigh then offered the following, which was unanimously adopted:

"In consideration of the aid and assistance bestowed to our comfort and advantage while sitting here during the time of holding the meetings of the State Board of Agriculture; therefore,

Be it resolved, That we hereby tender our heartfelt thanks to the local member, Chandlee Eves, for his untiring efforts in behalf of the arrangements made for the comfort of the members of the Board during our agreeable stay at Bloomsburg.

To the county commissioners for all privileges conferred to the advantage of the Board.

To the county agricultural society and to the citizens of Bloomsburg for procuring the opera house in which to hold our meetings.

To the editors of the respective newspapers published here for their favorable notices of the time and place of holding our meetings, and for publishing the proceedings of the same.

To the delegates of the agricultural societies, granges, and farmers' clubs, so numerously represented, who so closely and continuously attended and took part in our discussions and proceedings.

To our host and hostess for their kind attention and ample provisions made for the inner man, and for the comforts provided while staying here.

To the essayists of Bloomsburg and vicinity for the valuable assistance in providing and reading interesting and instructive essays, which proved such a help to the success of the meeting.

To the ladies who, for the first time since the organization of this Board, have contributed essays, which were listened to with marked attention, and to the ladies and gentlemen in general for their constant attendance, thereby encouraging the Board in its work, thus helping to advance the cause of agriculture."

On motion, adjourned to meet in Harrisburg, the fourth Wednesday in January, as provided by law.

MINUTES OF THE ANNUAL MEETING.

Held at Harrisburg, Pa., January 27 and 28, 1886.

Board called to order at 10.30, A. M., by Governor R. E. PATTISON in the chair.

Present, Governor Pattison, Secretary J. S. Africa, and Messrs. Piollet of Bradford, Reeder of Bucks, Hiester of Dauphin, Wilson of Juniata, Calvin of Lackawanna, Barnes of Lehigh, Smith of Luzerne, McKee of Mercer, Keller of Schuylkill, Speaker of Sullivan, Frederick of Union, McDowell of Washington, Underwood of Wayne. and Secretary. At a later period in the session, Superintendent Higbee and Messrs. Young of Dauphin, Garretson of Adams, Hale of Centre, Eves of Columbia, Mullin of Cumberland, Lantz of Lebanon, Foresman of Lycoming, and Herr of Clinton, were present.

The SECRETARY announced that the terms of membership of the members from the counties of Armstrong, Bedford, Berks, Blair, Bradford, Crawford, Delaware, Erie, Indiana, Lancaster, Montour, Somerset, Susquehanna, Venango, Warren, and York had expired, and hence the names of these members were not called.

The CHAIR named Messrs. Reeder of Bucks, Herr of Clinton, and Barnes of Lehigh, a committee to receive and report upon the credentials of newly elected members, and of delegates from local agricultural organizations.

On motion of Mr. FREDERICK, a recess was then taken to permit the Committee on Credentials to examine the certificates offered, and to make their report.

The Committee on Credentials reported that credentials in proper form were presented by the following members: J. C. Thornton of Erie, W. C. Gordon of Indiana, M. W. Oliver of Crawford, H. L. Scott of Bradford, R. S. Searle of Susquehanna, H. M. Engle of Lancaster, J. G. Zerr of Berks, F. R. Miller of Warren, W. S. Roland of York, Thomas L. Clapp of Montour, and C. C. Musselman of Somerset, and that they recommended that these gentlemen be granted membership as the proper representatives from their respective counties. They also reported the following delegates present with proper credentials: Chester County Agricultural Society, Alfred Sharpless, W. P. Hazard, and Edward Brinton; Columbia County Agricultural Society, Freas Fowler, C. L. Sands, and H. V. White; Union County Agricultural Society, E. Pontius; Lancaster County Agricultural Society, J. H. Landis, Johnson Miller, Joseph F. Whitmer, and W. S. Clark; Union County Council, P. of H., E. Shorkley; Grange No. 645, P. of H., George West; Pomona Grange, No. 22, P. of H., J. B. Kirkbride; Pomona Grange, No. 5, P. of H., E. H. Little; Penn Grange, No. 596, P. of H., H. G. App; Huntingdon County Pomona Grange, P. of H., A. P. White; Farmers' Association of Adams County, Amos W. Griest; Guernsey Breeders' Association, Henry Palmer, W. P. Hazard and Silas Betts; Farmers' and Housekeepers' Association, Elwood Conard; Philadelphia Produce Exchange, George E. Paul, William C. Borker, and John J. Habecker; Goshen Grange, No. 121, P. of H., E. J. Durnell; South Abington Farmers' Club, A. J. Ackerly; Solebury Farmers' Club. Alfred Paschall.

The committee also reported that credentials of W. L. Archer as member-elect from the Burgettstown Agricultural Society of Washington county, and of R. G. Kshinka, as member-elect from the Northern Columbia and Southern Luzerne Agricultural Society, had been presented to them, but as no vacancies existed in the representation of either of these counties, they recommended that the seats should not be granted. Report of the committee accepted, and ordered to be placed on file.

On motion of Mr. SMITH, seconded by Mr. KELLER, the Board then proceeded to the election of officers for 1886.

Nominations for Vice Presidents having been called for by the President, Mr. MCKEE nominated M. W. Oliver of Crawford, Mr. HERR nominated David Wison of Juniata, and Mr. HIESTER nominated Dr. J. P. Edge of Chester. On motion, nominations closed, and the Secretary directed to cast the ballot of the meeting for the three nominees, who were accordingly declared elected.

Nominations for seven members of the Executive Committee having been called for, Messrs. Engle of Lancaster, McKee of Mercer, Herr of Clinton, Hiester of Dauphin, McDowell of Washington, Reeder of Bucks, and Barnes of Lehigh were named, and, on motion of Mr. SMITH, the nominations were closed, and the Secretary directed to cast the ballot of the Board for the nominees, who were declared elected.

Mr. **HERR** of Clinton nominated Thomas J. Edge for Secretary, and, the nominations having been closed, the Chair was directed to cast the ballot for the nominee, who was declared elected.

The minutes of the preceding meeting were read by Mr. **HIESTER**, and, on motion of Mr. **SMITH**, approved as read.

On behalf of the Committee on Legislation, N. F. **UNDERWOOD**, chairman, made a report as follows: "Upon the subject of the matter submitted to the State Board of Agriculture by the Patrons of Husbandry of Union county, in relation to the use of 'leather scrap' as a source of nitrogen in the manufacture of commercial fertilizers, which subject was referred by the Board to the Committee on Legislation, we report that, according to information received from Prof. Genth, Chemist of the Board, he has made an analysis of some fifteen hundred samples of commercial fertilizers, and has only found leather scrap in one sample, and in that only to a limited extent. Under these circumstances, your committee do not see the necessity for further legislation on the subject.

"In relation to the resolution offered at the Bloomsburg meeting by Colonel Piollet, we would recommend its passage, with the following amendments:

"*Resolved*, That this Board recommend that in any adjudication of taxation upon imports, due consideration should be given to the interests of agriculture, and particularly to avoid all discrimination against agriculture in favor of manufacturing and other interests not more meritorious or deserving of the attention and favor of the National Government, and that it is further the opinion of this Board that, along with the duties upon manufactures, reasonable but substantial duties should be imposed upon all raw material and products that come in competition with our agricultural industries."

The committee would also report for adoption the following additional resolution:

Resolved, That the present depressed condition of sheep husbandry is entirely owing to the unfortunate and unwise changes in the tariff laws in the act of March 3, 1883, and that nothing short of the rates of 1867 on imported wool, or its equivalent, will be satisfactory to the flock-master.

Report of the committee adopted.

The Executive Committee reported the following as chairmen of the respective standing committees for the ensuing year:

Legislation.—John P. Edge.
Silk and Silk Culture.—J. P. Barnes.
Fruit and Fruit Culture.—G. Hiester.
Grasses and Fodders.—N. F. Underwood.
Forests and Forestry.—W. Gates.
Apiary and Bee Culture.—M. W. Oliver.
Dairy and Dairy Products.—E. Reeder.
Useful Birds.—C. C. Musselman.
Cereal Crops.—Joel A. Herr.
Wool and Textile Fibers.—John McDowell.
Fences and Fencing.—Chandlee Eves.
Farm Implements and Machinery.—I. Garretson.
Farm Stock.—Dr. E. W. Hale.

The committee also recommended that the Committee on the Work of the Board be dropped from the list of standing committees, as its work properly belongs to the Executive Committee.

Report adopted.

The Executive Committee presented the following financial statement as the result of an audit of the accounts of the Secretary by the Advisory Committee:

Expenses of members.

Expenses of Towanda meeting, June 17 and 18, 1885, . .	$343 08
Expenses of Lancaster meeting, September 30, 1885, . .	372 48
Expenses of Bloomsburg meeting, December 2 and 3, 1885,	423 06
Amount yet available for annual meeting, 1886, ...	361 38
Total appropriation, ...	$1,500 00

Expenses of local institutes.

Amount expended to date of annual meeting, 1886, . . .	$410 36
Amount yet available for institutes to June 1, 1886, . . .	539 64
Total amount of appropriation, ...	$1,000 00

Investigation of disease of domestic animals.

Amount expended to date of annual meeting, 1886, . . .	$148 15
Amount yet available up to June 1, 1886, ...	101 85
Total amount of appropriation, ...	$250 00

Office expenses.

Amount expended up to date of annual meeting, 1886, .	$392 84
Amount yet available up to June 1, 1886, ...	357 16
Total amount of appropriation, ...	$750 00

Report of the committee accepted, and ordered to be incorporated in the proceedings of the meeting.

The Executive Committee reported the following list of honorary officers of the Board:

Botanist.—Thomas Meehan, Germantown, Pa.

Pomologist.—E. Satterthwaite, Jenkintown, Pa.

Chemist.—Dr. F. A. Genth, University of Pennsylvania, West Philadelphia, Pa.

Consulting Veterinary Surgeon.—Prof. R. S. Huidekoper, University of Pennsylvania, West Philadelphia, Pa.

Veterinary Surgeon.—Dr. F. Bridge, West Philadelphia, Pa.

Entomologist.—Prof. W. A. Buckhout, State College, Pa.

Microscopists.—Dr. H. Leffman, Philadelphia, and Prof. C. B. Cochran, West Chester, Pa.

Ornithologist.—B. Harry Warren, West Chester, Pa.

Meteorologists.—Prof. I. T. Osmond, State College, and J. L. Heacock, Quakertown, Pa.

Mineralogist.—Col. James Wilcox, Philadelphia.

Geologist.—Prof. J. P. Lesley, State Geologist, Philadelphia, Pa.

Stenographer.—Col. H. C. Demming, Harrisburg, Pa.

On motion of Mr. FREDERICK, the list of honorary officers, as presented by the Executive Committee, was elected.

On motion of the SECRETARY, the revision of the by-laws, as recommended by the Committee on Work of the Board, was then taken up, and, after discussion by Messrs. Foresman, Wilson, Hiester, Keller, Smith, Garretson, Engle, McDowell, Searle, and Secretary, the old by-laws were again adopted without any material change.

Mr. SEARLE of Susquehanna then offered the following, which was adopted:

Resolved, That a standing committee on water-supply for farm buildings and farm stock and irrigation, to embrace the whole subject of water-supply, be appointed and instructed to prepare a report on the subject, to be presented and read at the next meeting.

The CHAIR then named R. S. Searle as chairman of the committee, with power to name the members.

The SECRETARY then presented the invitation of the Philadelphia Produce Exchange to the members of the Board, to coöperate with them in an endeavor to induce the National Butter, Cheese, and Egg Association to hold their next annual meeting and exhibition in Philadelphia. After extended discussion by Messrs. Piollet, Barker, Harbecker, Oliver, and Smith, it was, on motion of Mr. OLIVER, resolved that the Chair be authorized to name a committee of three to confer with the committee of the Philadelphia Produce Exchange, and report to the Board as soon as possible.

The CHAIR named Messrs. Oliver, Scott, and Reeder, as said committee of conference.

The SECRETARY presented a request from the Secretary of the American Agricultural Congress that the Board would appoint delegates to attend the annual meeting of the Association in New York, February 18, 1886.

The CHAIR, having been authorized to appoint three delegates, named Messrs. Oliver of Crawford, Piollet of Bradford, and Reeder of Bucks.

On motion, adjourned until 2, P. M.

WEDNESDAY AFTERNOON, *January 27, 1886.*

Board called to order at 2, P. M., by Hon. R. E. PATTISON in the chair.

In accordance with the request of the Executive Committee, the chairmen of the respective standing committees announced the members of their committees as follows:

Legislation.—J. P. Edge, J. D. Hicks, J. McDowell, M. W. Oliver, C. C. Musselman, N. F. Underwood, and W. Gates.

Silk and Silk Culture.—J. P. Barnes, W. S. Roland, J. P. Edge, David Wilson, and R. S. Searle.

Grasses and Fodders.—N. F. Underwood, E. Reeder, J. McDowell, P. Frederick, W. R. Shelmire, J. A. Herr, Thomas Meehan, and J. C. Thornton.

Forests and Forestry.—W. Gates, D. H. Foresman, R. S. Searle, F. R. Miller, A. J. Ackerly, W. C. Gordan, I. Garretson, H. M. Engle, and E. W. Hale.

Cereal Crops.—J. A. Herr, M. W. Oliver, J. C. Thornton, J. McCracken, Jr., L. B. Speaker, W. C. Gordon, P. Frederick, J. G. Zerr, Col. J. Young, and C. C. Musselman.

Useful Birds.—C. C. Musselman, W. S. Roland, J. S. Keller, B.

Harry Warren, J. P. Barnes, M. W. Oliver, A. D. Shimer, and G. Hiester.

Farm Implements and Machinery.—I. Garretson, J. A. Herr, M. W. Oliver, A. W. Griest, Chandlee Eves, C. C. Musselman, and N. F. Underwood.

Wool and Textile Fibers.—J. McDowell, M. W. Oliver, John R. Miller, John McNary, John M. Stockdale, and J. W. Axtel.

Farm Stock.—E. W. Hale, C. C. Musselman, I. Garretson, Col. J. Young, M. W. Oliver, and H. L. Scott.

Fruit and Fruit Culture.—G. Hiester, H. M. Engle, D. Wilson, I. Garretson, C. C. Musselman, M. W. Oliver, W. S. Roland, N. F. Underwood, J. S. Keller, J. A. Herr, J. McDowell, and E. Satterthwaite.

Dairy and Dairy Products.—E. Reeder, M. W. Oliver, C. C. Mustelman, I. Garretson, H. L. Scott, and Chandlee Eves.

Roads.—J. W. Mather, J. D. Hicks, D. G. Foresman, H. L. Scott, J. McDowell, C. C. Musselman, J. E. Noble, I. Garretson, J. A. Woodward, J. A. Herr, and Thomas J. Edge, Secretary.

Fences and Fencing.—Chandlee Eves, N. F. Underwood, L. B. Speaker, M. W. Oliver, J. D. Hicks, and Thomas J. Edge, Secretary.

Apiary and Bee Culture.—M. W. Oliver, I. Garretson, William Gates, J. Shallcross, Arthur Todd, Mrs. M. L. Thomas, G. Prizer, W. Hottensein, and H. H. Brown.

Water Supply to Farms.—R. S. Searle, J. C. Thornton, Dr. J. P. Edge.

On motion of the SECRETARY, the Board then proceeded to select a place for the spring meeting, when Mr. COLVIN named Dalton, Mr. FREDERICK named Lewisburg, and Mr. GATES named Franklin. After discussion, Mr. COLVIN withdrew the name of Dalton and substituted that of Scranton, and Mr. GATES withdrew Franklin. A vote was then taken, resulting in the choice of Scranton by a majority of thirteen votes.

On motion of Mr. KELLER, the last week in May was suggested as the time. Not agreed to. When, on motion of Mr. SMITH, the time of the meeting was left to the Advisory Committee and the resident member of the Board, Mr. Colvin. Motion discussed by Messrs. Colvin, Searle, Wilson, Keller, Dr. Edge, Smith, Frederick, Herr, Gates, and Secretary.

The SECRETARY presented an official invitation from the managers and stockholders of the Chester County Agricultural Society for the Board to hold its autumn or winter meeting at West Chester, which was, on motion of Mr. BARNES, placed on file for reference at a future meeting.

Essays and discussions having been called for by Mr. KELLER, Mr. MUSSELMAN of Somerset, on motion of Mr. OLIVER, read an essay on "Book Farming," which was discussed by Messrs. Smith, McDowell, Young, Garretson, Governor Pattison, Searle, Wilson, Musselman, Piollet, and Keller, when, on motion of Mr. HIESTER, the discussion was closed.

Mr. H. H. COLVIN, member from Lackawanna, then read an essay on "Expectations and Experience," which elicited discussion upon the part of Messrs. Hazard, McDowell, Keller, and Gates.

Mr. UNDERWOOD, member from Wayne, read an essay upon "Boundary Lines," the subject-matter of which was discussed by Messrs. Searle, Zerr, Oliver, and Dr. Edge.

Dr. J. CALDER, lecturer of the Pennsylvania State Grange, P. of H., read an essay on "The Rights and Duties of Farmers," which called out remarks from Messrs. Musselman, Piollet, Keller, Wilson, Calder, and others.

"Questions and Answers" then being in order, Mr. **Keller** of Schuylkill asked whether any one present knew of the following: "Is there any stock upon which the apple can be worked which is borer-proof?" Messrs. Engle, Hiester, Oliver, and others all gave a negative answer, or to the effect that any such stock would dwarf the tree.

On motion, adjourned until 7.30, p. m.

Wednesday Evening, *January 27, 1886.*

Board called to order at 7.45, p. m., by Hon. R. E. **Pattison** in the chair.

Dr. E. W. **Hale**, member from Centre county, presented an invitation, from Dr. G. W. Atherton and himself, for the Board to hold a meeting at Bellefonte, with one day's session at the Pennsylvania State College.

On motion, referred to the Secretary, to be placed on file for future reference.

On motion of Mr. **Foresman** of Lycoming, W. P. **Hazard** of West Chester read an essay in answer to the question, "Can Women find Profitable Employment in the Dairy and in Raising Thoroughbred Stock?" Its subject-matter was discussed by Messrs. Searle, Hazard, Zerr, Barnes, Carter, Colvin, Kshinka, Dr. Edge, Piollet, and Secretary.

Dr. E. W. **Hale**, member from Centre, read an essay upon "What I Saw in Europe," which was discussed by Messrs. Foresman, Landis, Searle, Hazard, Dr. Edge, Wilson, and Keller.

After the transaction of several items of miscellaneous business, on motion, adjourned until 9, a. m., January 28.

Thursday Morning, *January 28, 1886.*

Board called to order at 9, a. m., by Hon. R. E. **Pattison**, President, in the chair.

Mr. **Frederick**, member from Union, read an essay on "Progress in Methods and Results in Agriculture."

Committee on Credentials presented the credentials of J. D. Hicks, member-elect from Blair, which, not being in the form adopted by the Board, were referred to the Secretary, with instructions to return them to Mr. Hicks, with the blank form adopted by the Board.

Mr. **Kshinka**, who was elected by the Northern Columbia and Southern Luzerne Agricultural Society, then stated his case, as directed by his society; when, after discussion by His Excellency the Governor, and Messrs. Barnes, Keller, Oliver, Hiester, and others, it was decided that the Board had no choice in the premises, but must be governed in its decisions by the law under which it was constituted.

The committee appointed to confer with a committee of the Philadelphia Produce Exchange reported that a conference had taken place, and that they were of the opinion that the Board would not be authorized in extending a promise of pecuniary assistance, as it had no funds appropriated for such a purpose. The committee recommended that the Board should coöperate with the Produce Exchange committee in any possible way. Report accepted, and the committee continued, with instructions to assist the Produce Exchange in any possible way within the limits of the instructions of the Board, and the law forming it.

On motion of Mr. FORESMAN, it was decided that it was best to omit the lecture arranged for the evening session, and the Secretary was directed to so inform the lecturer.

On motion of Mr. SMITH, the regular order of essays was then resumed, and Hon. GEORGE HOOD of the State Senate read an essay on "Fence Laws of Pennsylvania," which was listened to with unusual attention.

On motion of Mr. FORESMAN of Lycoming, the discussion of Mr. Hood's essay was deferred until after the reading of the next two, upon similar topics, on the programme.

Mr. REEDER of Bucks then read an essay on "Wooden Fences—Their Cost and Durability," and was followed by one by John I. Carter of Chester county, on "Wire Fences." At the request of His Excellency the Governor, Col. JAMES YOUNG of Dauphin addressed the Board upon the subject of "Stone Walls." After which the discussion ranged over the whole subject, as covered by the four essays, and was participated in by Messrs. Barnes, Brosius, Garretson, Searle, Secretary, Thornton, Wilson, Engle, Keller, Kshinka, Hall, Little, Governor Pattison, Musselman, Whitmer, Shorkley, Gates, White, Calder, Colvin, Hiester, and Foresman.

On motion of Mr. BARNES, the Board then took a recess in order to permit of the presentation to Governor Pattison of a cane, from the members of the Board, as a testimonial of their esteem and regard for him as the President of the Board.

On behalf of the Board, Mr. McDOWELL of Washington presented the cane in the following language:

GOVERNOR: The act establishing the Board of Agriculture has brought representatives from almost every county in this great Commonwealth to meet in session to deliberate and devise by discussions and essays such methods, and give such results from practical tests, as will help on and further develop the interests of agriculture in all of its features.

The act also wisely provides that the Executive of the Commonwealth shall be its presiding officer. As members of the Board, it gives us great pleasure to see you, at each and every meeting, enter on and continue in your part of the work with us with so much zeal, earnestness, impartiality, and fidelity. You have, thereby, infused into its members the spirit of progress, and a willingness to work. "As iron sharpeneth iron, so doth man the countenance of his friend." We no longer rock in sleepy ease in the cradle of our infancy; we have grown up; you have had much to do with making this Board a power in developing the agricultural resources of this State. The science of agriculture will, however, be the study of ages to come; we are progressing; we think that we are not claiming too much when we assert that the agricultural interests of this State, through this Board and other valuable aids, are equal to, if not in advance of, that of any other State in our Union.

As members of this Board, we cannot too highly appreciate your valuable services, as its presiding officer, in guiding us in all of our transactions; therefore, at this, the last annual meeting of your term of office, we, the members of the Board, present you with this gold-headed cane inscribed, "Presented to Governor R. E. Pattison by the members of the State Board of Agriculture of Pennsylvania, January 28th, 1886," which we most willingly do as a testimonial of our appreciation of your faithful, able, and efficient service as our presiding officer, and when you retire from office and lean upon this staff, or stand it in its place, may it revive in your memory old associations of warm friends, never to be forgotten.

Governor PATTISON replied as follows:

Mr. McDOWELL AND MEMBERS OF THE BOARD: I fully appreciate this pleasant evidence of the feeling you entertain for me as your presiding officer. This is my fourth and last year of official association with you in this Board, and I wish to say that our acquaintance has been exceedingly agreeable to me. These years have been fraught with much information which I value highly. I have not only been favored with the pleasure of your society, but I have been instructed through your numerous papers and discussions. And what you have been to me you have been to the people of the Commonwealth, for the results of your work here have been distributed, generally, over the State. I have watched, with great satisfaction, the progress of your good work, and I am sure that I am not in error when I say there is a growing interest in it among the people. They are coöperating to a considerable extent, and, as the Board may extend its field and widen its influence, the results to the people will be correspondingly greater. Permit me to say that I am much indebted to you; that I am grateful for your kindness, and that I appreciate the nature and importance of your work. Our paths diverge to-day, and we return to our homes. If any of us should not meet again in annual session, I trust we shall meet in that country where all are neighbors, and where all neighbors are friends. Gentlemen, again I thank you. [Applause.]

The Board having again come to order, the following questions were taken from the question box: "Are there any Pennsylvania farmers who believe that wheat will turn to chess or cheat?" The discussion, which was confined entirely to the negative side of the question, was participated in by Messrs. Keller, Searle, Smith, Musselman, Whitmer, Landis, and Secretary.

Mr. ENGLE of Lancaster asked: "What is the proper season of the year to cut timber to be the most durable?" The discussion of the answer to this question was participated in by Messrs. Speaker, Smith, McDowell, Zerr, Engle, Barnes, Brosius, Musselman, Palmer, Wilson, and Miller. The substance of the discussion indicated that the majority preferred August or early September.

On motion of Mr. BARNES, adjourned until 2, P. M.

THURSDAY AFTERNOON, *January 28, 1886.*

Board called to order at 2, P. M., by Hon. R. E. PATTISON in the chair.

ELWOOD CONARD, delegate from the West Grove, Chester county, Farmers' and House-keepers' Club, asked for an expression of opinion from the Board in answer to the following question: "What are the practical advantages of crushing the corn-stalk for provender for cows over the ordinary method of cutting it from one to two inches in length?" Answers in various forms were given by Col. Young and Messrs. Conard, Little, Searle, Whitmer, Engle, Zerr, Oliver, Thornton, and Secretary; all agreeing that the only advantage which could possibly be claimed was that of a saving of labor to the cow. This discussion brought out the opinion that the portion of corn-fodder below the husk had but little food-value except as a means of distension, and that this small value was due to a small percentage of sugar which remained in the spongy center of the stalk, and the flinty covering or envelope had not food-value at all.

Hon. **JOHN A. WOODWARD** of Centre county then read an essay in answer to the question, "What Does the Farmer Most Want to Know?"

W. P. **HAZARD** of West Chester read an essay on "Raising Grapes," which was listened to with marked attention, and which caused considerable discussion.

Hon. W. **GATES**, member from Venango, read an essay in answer to the question, "How to Bring Up a Worn-Out Farm." The subject-matter of which was discussed by Messrs. Young, Whitmer, McDowell, Piollet, and Secretary.

Col. **PIOLLET** then addressed the Board on the subject of taxation, when, on motion of Mr. **SEARLE**, seconded by Mr. **GATES**, the Board adjourned, subject to the call of the Advisory Committee.

MINUTES OF THE SUMMER MEETING.

Held at Scranton, Pennsylvania, June 16 and 17, 1886.

Board called to order at 9.30, A. M., by Hon. R. E. **PATITISON** in the chair.

Hon. H. W. Northrup, on behalf of the Lackawanna County Agricultural Society and citizens of Scranton, welcomed the Board as follows:

Mr. President and Gentlemen of the State Board of Agriculture:

It is with great pleasure, I assure you, that I, this morning, bid you a hearty welcome to Lackawanna county—to the youngest of the sisterhood—and to the enterprising city of Scranton. I think I realize that it is no small privilege for an humble farmer to welcome our Governor and the State Board of Agriculture to this great metropolis of north-eastern Pennsylvania. I feel, as a certain man once said to an appreciative audience, that this is a grand opportunity to say something or else to hold my tongue.

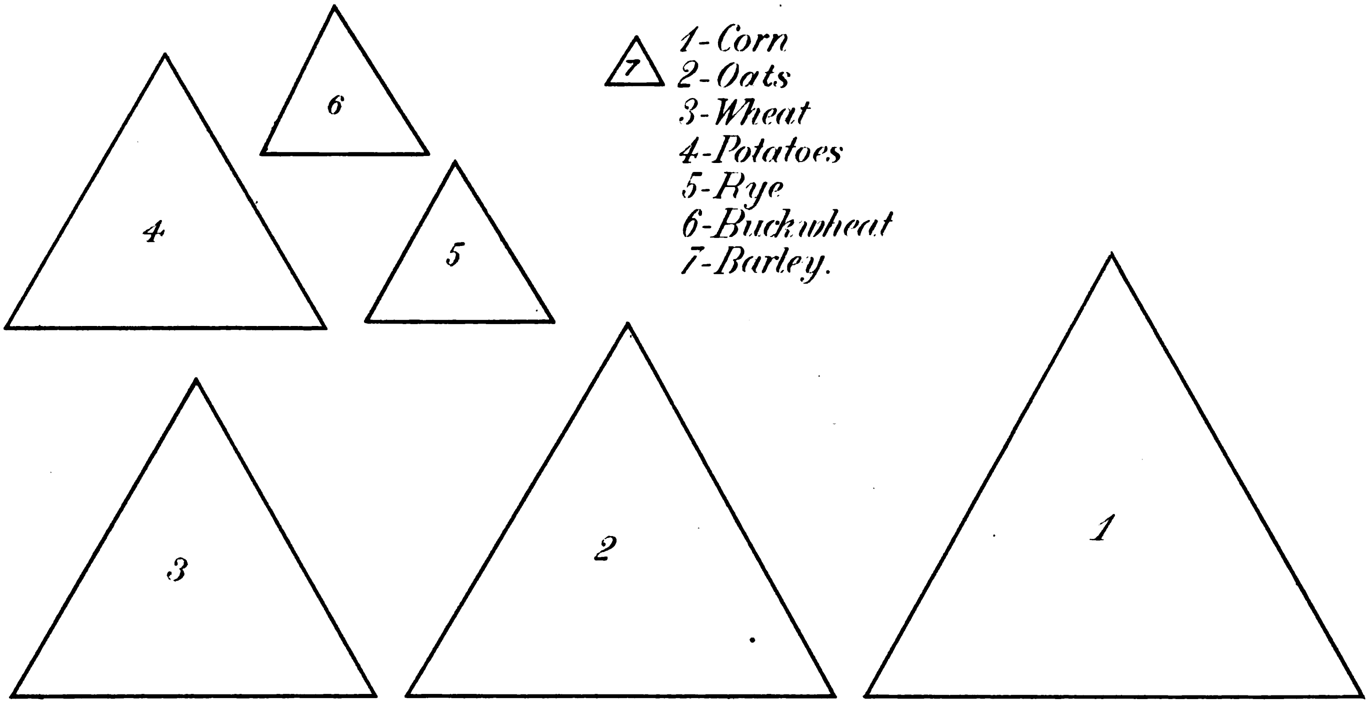
Having been officially summoned to this position, I feel I cannot honorably retire, and I ask your indulgence for a few moments. I am fully aware that this duty on other occasions is assigned to honorables and professionals. That programme is omitted this time, and this customary work has been given to one more distantly related. But I wish you to know this reception is none the less cordial and hearty, although it be lacking this requisite this morning.

We are exceedingly glad to see the Executive of this Commonwealth in the presidential chair of this Board. We know he has been in the habit of attending these meetings and giving them his countenance and support. When the highest officer of the Commonwealth meets with farmers from the different parts of our State and helps to make "our calling and election sure," he proves he is the farmer's very best friend, and we greatly desire that he may be well cared for during his stay in Scranton, and we know that he will be.

Mr. President, we welcome you here as the Governor of the great Commonwealth of Pennsylvania, no less as president of this agricultural organization, that is so becoming to your high position.

We welcome you, gentlemen, and members and friends of this Board.

We have been pleading with you for more than a year to make us a visit, and we are happy to know this morning that our anticipations are being realized. We heartily congratulate you on this your first visitation in Scranton. We recognize you as intelligent workers in one of the most honorable employments of man. We realize that the results of your meetings have a boundless influence all over the State. We know that you are coming among us without any earthly remunerative reward, or the



Comparative bulk of Pennsylvania Crops.

hope of reward, only the consciousness of raising the standard of agriculture, and we are glad to meet you here. We confess, with some degree of modesty, at least, that we cannot show you so many gardens of Eden as are found in Chester and Lancaster, and other counties of the State, but just over these mountains surrounding this rich valley, about ten minutes, more or less, distant, we have some fine pasture-fields, green meadows, and beautiful landscapes, where we call home, that are very dear to us. They were secured by the exertions of pioneers. They were men of the Roger Williams stripe, and we cherish their memories with reverence. We cannot show you such great bins of wheat as our Lancaster brethren have, but we can grow such things as are usually very profitable to us, and we enjoy the same seasons generally that enrich our southern brethren. We find a ready market for our products at remunerative prices, and send our surplus often to the great cities. We are not so wealthy as to be envied, but we know that we are pleasantly located among the foot-hills of these beautiful mountains.

You are here in the center of the anthracite coal field. We need not tell you that we have an abundance of that article to warm our friends, for the fact is known and appreciated throughout our whole country. We are willing to acknowledge, as Colonel Piollet said when we asked for this meeting, that our most valuable production in Lackawanna county grows under ground. If your curiosity should desire it, we can safely transport you down into the bowels of the earth over five hundred feet by the aid of machinery, and, upon your desire to return, carry you in a moment to the surface.

Mr. President and gentlemen, we welcome you to this the third city in rank of population in the State. I desire you to become familiar with its many industries. I feel it my duty to invite your attention for a moment to its settlement and growth. A little more than forty years ago, Scranton Hollow, known as Slocum's Hollow, possessed less than a dozen dwellings and two rudely-constructed mills, with a crude school-house standing by the side of Roaring Brook, and the whole population was seventeen souls. Seventy years ago, the deer and bear, the panther and the wild cat, all dwelt here. Less than seventy years ago, the land occupied from the public buildings to the railroad, near Lackawanna depot, was being cleared by the woodman's ax. Fifty years ago, one hundred acres of land were agreed on, with long credit, at ten dollars an acre, and near here is a beautiful tract of coal land, which, fifteen years before the completion of the railroad along its length, could have been purchased at fifteen dollars per acre.

There are many historical facts connected with this place as the former home of the Indian. His relics have been found here in great abundance. His implements of savage warfare, directed by his sly and skillful hand, have moistened this ground with innocent blood. Nothing to-day is left to mark his footsteps save the bold banks of his fishing-ground.

Scranton city commenced its growth forty years ago, when Colonel George W. and Selden D. Scranton, accompanied by one or two men, passed over the Pocono mountain by a rugged road, the men showing to him the big coal beds and select iron ore, and securing the purchase for sixteen dollars per acre. After that the city sprang up more quickly than some more favored fields, part of it now being located upon what was once considered an impassable swamp, and to-day in our prosperity we welcome, and desire to entertain in a becoming manner, the President of this Board of Agriculture, the Chief Executive of the great Commonwealth of Pennsylvania. Although we have been expecting you, your visit at last is almost a surprise to our own people.

We welcome you to the county seat of Lackawanna county. We do not say it to boast, but we say it because we mean it—we welcome you to this city of seventy thousand inhabitants, with its evidences of thrift and prosperity around you. We invite you to visit its mines, its car shops foundries, its iron mills and steam mills, its machine shops and its factories, its silk works and stove works, and other industries; its mammoth blast furnace—one of the original great beginnings of the city—said to be driven by the largest and most powerful engines on the continent. Our court-house, corresponding to one of the largest in the mother county of Luzerne, the same day it was born, called the "Swamp Angel," cost two hundred and fifty thousand dollars; but, then, the Lackawanna Iron and Coal Company presented the grounds to make it satisfactory, and our farmers are helping to pay off the debt. So it is our court-house. [Laughter and applause].

You are familiar with our railroad and canal facilities. They are appreciable on every side. The Delaware, Lackawanna and Western, with its four hundred and nine miles of double track, the Philadelphia and Reading, and the Pennsylvania Coal Company, and the Bloomsburg and Lackawanna, connected with the Delaware, Lackawanna and Western—all of these are in active operation, and their locomotives and cars can be constructed right here—a great accommodation. There are transported daily from this territory thousands of tons of iron, Bessemer steel, and anthracite coal, and there are unloaded and loaded hundreds of cars of rich freight at the several depots. Whoever reads the daily papers will notice the fact that eighty-one daily passenger trains arrive and depart from this city. Labor is here respected and paid for. One, at least, who came to this city and commenced work on seventy-five cents per day, has accumulated a fortune and is now a millionaire; and, more than that, he is a grand, good citizen, and one of the leading enterprising business men of Scranton.

But we have only been speaking of the financial prosperity of our city. The moral and intellectual wants of our people are well provided for. We are a law-abiding people. This city has erected, and is ably supporting, from thirty to forty churches, whose pulpits are occupied by a talented and educated ministry, and a fair proportion of our people attend them. The Sunday-schools and the Young Men's Christian Association are largely supported by the different denominations, and the higher law is respected.

The press, with its daily and nightly vigilance, is satisfying a thirst for information, and the newsboy upon the street, as you will soon discover, is alive to his interest, and will hail you to purchase of his package.

We are contemplating the prospect of soon having a Government post-office building erected here, and, through the efforts of our Congressman, Joseph A Scranton, we anticipate an appropriation of one hundred and seventy-five thousand dollars, fifty thousand dollars of which has already been received for this specific purpose, to accommodate the wants of our people.

We claim to be a kind-hearted, sympathetic people, and are touched with the feelings and the infirmities of the afflicted. We have our hospitals, our Home for the Friendless, our School for Deaf Mutes, and our Hill Farm, with its beautiful lawns and fragrant flowers, where the poor and unfortunate are well cared for. The city requires in the neighborhood of thirty public schools, secured at a cost of over three hundred thousand dollars, and a list of nearly eight thousand pupils are found upon the rolls.

We welcome you to all the enjoyments these various interests afford, and we hope you will not be hasty in retiring from our borders. The board of trade in this city kindly offer you the free use of their rooms for the transaction of special and committee business, and they will be kept in readiness for your convenience. At a convenient time representatives of that board will be pleased to accompany you through the city.

I hope, when you see fit to take your deporture, you shall have had a very pleasant meeting, and carry with you a pleasant remembrance of our people and the city of Scranton.

On behalf of the Board, Hon. R. E. PATTISON, President, spoke as follows:

I heartily thank you, in the name of the State Board of Agriculture, for these words of earnest welcome. It was said of General Sherman, that, when a young lieutenant, he was ordered to Washington, and he departed in all the glory of a new uniform. While standing in front of his hotel quietly smoking a segar, he attracted the attention of a lot of "small boys," one of whom astounded him with the question: "I say, mister, where's your engine goin' to squirt?" The members of the State Board are not soldiers, and whenever they appear in any community, no such mistake is possible, as was apparent in the case of the brave soldier alluded to. They come to represent peace—not war. We are gratified at the marks of material progress here in your community. While not a "city set upon a hill," it is, nevertheless, a city "that cannot be hid." Its record is well known, and its influence is admitted. Starting like a grain of mustard seed less than forty years ago, it has risen into a commanding position. It is a flourishing city. Its wonderful growth in population is the best proof of the material strength it controls. Where capital finds an outlet, labor follows with its sinewy arms, and where labor enters, prosperity abounds. Here is a vast market, then, for the agriculturist interest.

When Washington was chosen commander-in-chief, more than a century ago, the was quite unable to leave Philadelphia. Congress was in session ; but he dropped a farewell note to his wife, and started in company with General Lee and others. After a ride of twenty odd miles he met a messenger with news from Bunker Hill. Washington asked how the American troops stood the fire of the enemy. The reply was that they held their fire until the enemy was within three rods of them, and then let loose with tremendous effect. So it is with successful effort all the world over. In every case there are obstacles to overcome, requiring genius as well as bravery. Here these obstacles were duly faced and surmounted, and a brave grapple with opposing odds paved the way for this beautiful city, which now rises in all its grand proportions around us.

The agriculturist represents one of the greatest interests known to mankind. It lies at the foundation of every material phase of happiness. And the State Board have come into your city to-day, from different parts of the Commonwealth, to exchange views on this subject, and to deliberate over the best ways and means for promoting the welfare of the farming element of the State. Other interests are represented by boards of trade and exchanges, and associations. They have newspapers and periodicals. They shape sentiment and practice. But the agriculturist has not reached that point. The nearest approach to it is this State Board. You will find that their deliberations are fraught with importance. What can we hope for if the soil, which is the fountain of so much wealth, is not also considered with special reference to meeting the demand for its grain, fruits, and flowers?

We have no doubt that the Board will receive every attention from your people. And I am sure it will be fully appreciated. There is a sense in which I may say that our coming was anticipated long ago. In the development that has taken place here during long decades now past away, not only were the principles of free government established, but that comity was recognized which should exist between the people of

all parts of a State, and that commonness of interest fostered which binds us together now. Indeed, the very centuries have anticipated the interchange of commodities, and the commingling of the people, which marks our common welfare to-day. It is a subject of deep attraction and full of suggestion, but we have no time to discuss it here and now. I only want to call to your recollection that high command which bids us "love one another," for if men do that they will guard one another's interests, and make the welfare of one the happiness of all. Surely, in this case, as agriculture contributes so directly and practically to the welfare and happiness of all classes—we could not long exist without it—our duty is apparent. Let us seek to foster and strengthen it. In that way all can do something towards its future development. There was a period when the black diamond was not valued. Its worth was unknown to men. So the very ores which have enriched our State lay untouched, because no one understood how to utilize them to the greatest advantage. But as soon as this condition of things was supplanted by a better, there came a revolution that has provided wonderfully, not merely for brawn and bullion, but for ten thousand needs of human society. So let it be always. Having the knowledge we possess concerning agriculture, let us all feel that we have a duty to perform in carrying its interests forward, and that in so doing we are but adding to the wealth and greatness and welfare of our people. The clothes we wear, the food we eat, and even the homes that shelter us are dependent upon the success of the operations of the agriculturist. (Applause.) Thanking you, fellow citizens, for your cordial welcome, I beg leave in turn to welcome you all to our deliberations.

Present, Hon. R. E. Pattison, Col. V. E. Piollet, and Messrs. Garretson of Adams, Zerr of Berks, Scott of Bradford, Herr of Clinton, Eves of Columbia, Oliver of Crawford, Colvinn of Lackawana, Barnes of Lehigh, Smith of Luzerne, McKee of Mercer, Searle of Susquehanna, Frederick of Union, Gates of Venango, Miller of Warren, Underwood of Wayne, and Secretary.

The CHAIR named Messrs. Oliver, Scott, Zerr, Barnes, and Eves a committee to receive and report upon the credentials of members-elect and delegates.

On motion of Mr. HERR of Clinton, the reading of the minutes was dispensed with.

The committee reported that Joseph E. Noble of Bedford, F. R. Miller of Warren, William Gates of Venango, and Nelson G. Bunnell of Wyoming, presented certificates of election from the societies of their respective counties, and that the certificates were in proper form, and the gentlemen named entitled to membership in the Board for terms of three years from the last annual meeting. They also reported that the North Abington and Glenburn Farmers' Club was represented by Isaac Ellis, H. W. Northrup, Thomas Smith, A. C. Sission, J. W. Tiffany, and Horace Seaman; the South Abington Farmers' Club by R. P. Parker, J. L. Stone, A. J. Ackerly, Geo. E. Stevenson, G. N. Carpenter, and J. D. Knight, and the Agricultural Association of Columbia county by. H. V. White, all of whom presented proper credentials.

On motion of Mr. SMITH of Luzerne, seconded by Mr. COLVIN, the certificates of the members-elect were received, and they admitted to membership.

On behalf of the Committee on Silk and Silk Culture, Dr. J. P. BARNES, chairman, presented a report, which was accepted and ordered printed.

Owing to the absence of C. C. MUSSELMAN, chairman, no report was received from the Committee on Useful Birds.

The report of the Committee on Forests and Forestry was, at the request of Mr. Gates, chairman, postponed until a subsequent session.

Owing to the absence of Dr. E. W. Hale, chairman, no report was received from the Committee on Farm Animals.

The report of the Committee on Fruit and Fruit Culture was then read by Hon. A. O. Hiester on behalf of the committee, and, after discussion, was accepted and ordered printed in the proceedings of the Board.

Mr. McDOWELL, chairman, on behalf of the Committee on Wool and Textile Fibers, presented a full and complete report, which, after discussion by Messrs. Piollet, Searle, Noble, McDowell, Smith, and the Secretary, was accepted, and the Secretary directed to incorporate it in the proceedings of the Board.

On behalf of the Scranton Board of Trade, R. W. Luce, Secretary, presented the following communication :

SCRANTON, *June 16, 1886.*

To the State Board of Agriculture :

GENTLEMEN : The Scranton Board of Trade respectfully tender the use of their rooms, No. 421 Lackawanna avenue, for committee work, &c., and through the kindness of Superintendent Halstead, have arranged for an excursion to the mines of the Delaware Lackawanna and Western Railroad Company in Keiser valley. If you find it desirable to visit the mines, please name the time most convenient for your members.

Respectfully,
R. W. LUCE,
Secretary.

H. H. COLVIN of Lackawanna, presented a communication from Mr. Richmond, inviting the Board to visit his farm. The Secretary announced that, owing to illness, Messrs. Huidekoper, Hazard, and Warren were unavoidably absent, and that there would consequently be a vacancy in the programme of Thursday, the 17th. After discussion, it was resolved to shorten the meeting one session, and to accept the invitations of Mr. Riohmond and the Board of Trade for Thursday afternoon at two o'clock.

Mr. PIOLLET of Bradford offered a resolution directing the Secretary to have the report of the Committee on Wool and Textile Fibers printed and sent to our members in Congress. After explanation by the Secretary that the Board would have no power, without special legislation, to print a document of that size, the resolution was withdrawn.

The Committee on Credentials presented the credentials of Solomon Lewis as a delegate, which, on motion of Mr. NOBLE, were accepted.

On motion of Mr. OLIVER of Crawford, the Chair was requested to name a committee of three to draft a resolution expressive of the wishes of the Board in relation to the bill to regulate the manufacture and sale of imitation butters, now before the Senate of the United States. The Chair named Messrs. Oliver, Piollet, and Scott to prepare the said resolutions.

On motion of Mr. HERR of Clinton, the question of appointing delegates to visit and report on county fairs was then taken up, and after discussion by Messrs. Barnes, Herr, Zerr, and Secretary, was referred to the Executive Committee.

On motion, adjourned.

WEDNESDAY AFTERNOON, *June 16, 1886.*

Board called to order at 2, P. M., by M. W. OLIVER, Vice President, in the chair.

Present, Messrs. Piollet of Bradford, Dr. Edge of Chester, Atherton of Centre, Garretson of Adams, Noble of Bedford, Zerr of Berks, Scott of Bradford, Reeder of Bucks, Hale of Centre, Brown of Clarion, Herr of Clinton, Eves of Columbia, Oliver of Crawford, Gordon of Indiana, McCracken of Jefferson, Colvin of Lackawanna, Lantz of Lebanon, Barnes of Lehigh, Smith of Luzerne, Foresman of Lycoming, McKee of Mercer, Clapp of Montour, Shimer of Northampton, Searle of Susquehanna, Frederick of Union, Gates of Venango, Miller of Warren, McDowell of Washington, Underwood of Wayne, and Secretary.

On motion, the Board proceeded to fix the time and place of the next meeting. On behalf of the society which he represents, M. W. Oliver of Crawford invited the Board to hold its next meeting at Conneautville. After discussion, the invitation was accepted and the time referred to the Advisory Committee and the resident member.

A. C. Sission of LaPlume then read an essay on "The Cultivation of Fruit for Profit and Pleasure," when, at the suggestion of the President, discussion was deferred until after the reading of all essays upon fruits.

Wallace Tiffany addressed the Board upon apple-culture, and Dr. James Calder read an essay on "Raspberries—Varieties and Culture," when, on motion, the question of fruit-culture was declared open for discussion, and was discussed by Messrs. Sission, Searle, Birkenbine, Cooper, Jessup, Herr, Garretson, Reader, McDowell, Gates, Pellam, Willets, Scott, Richards, Leffmann, and Secretary.

H. C. Northrup then read an essay in answer to the question, "What Inpucement does Agriculture Offer to a Young Man about to Choose a Profession?"

L. B. Green of Dalton read an essay on "Farmers and Farmers' Wives," which called out discussion from Messrs. Searle, Foresman, Northrup, and Piollet.

Hon. Mr. Shultz of New York addressed the Board upon the subjects of the tariff and the manufacture of imitation butters. Remarks were also made by Messrs, Piollet, Herr, Cochran, and Smith, when, on motion, adjourned.l

Wednesday Evening, *June 16, 1886.*

Board met at 8, p. m., to hear an address by Dr. H. Leffman, microscopist of the Board, on the subject of "Cell Growth of Plants." The address was illustrated by photographs, and received marked attention.

Thursday Morning, *June 17, 1886.*

Board called to order at 9, a. m., by M. W. Oliver, Vice President, in the chair.

W. C. Gordon of Indiana county read an essay on "Fashionable Breeding and What it Costs."

James E. Carmalt addressed the Board on the "Art of Breeding," and the subject of breeding was declared open for discussion.

Mrs. M. V. Bowman read an essay on "Intellectual Culture for Farmers' Families," and Mrs. F. M. Leighton one on "Farmers' Boys," both of which were listened to with more than usual attention.

MINUTES OF THE AUTUMN MEETING.

Held at Conneautville, Crawford county, Pennsylvania, October 13th and 14th, 1886.

Board called to order at ten o'clock, by Prof. David Wilson, Vice President, in the chair.

Present—Messrs. Atherton of Centre, Garretson of Adams, Zerr of Berks, Reeder of Bucks, Wise of Butler, Hale of Centre, Herr of Clinton, Eves of Columbia, Oliver of Crawford, Harvey of Delaware, Hiester of Dauphin, Wilson of Juniata, Colvin of Lackawanna, Smith of Luzerne, Foresman of Lycoming, Clapp of Montour, Keller of Schuylkill, Speaker of Sullivan, Frederick of Union, Gates of Venango, Miller of Warren, McDowell of Washington, Underwood of Wayne, Roland of York, Bunnell of Wyoming, Thornton of Erie, Musselman of Somerset, and Clopper of Westmoreland.

In the absence of the Secretary, who was detained by sickness, G. Hiester was chosen secretary *pro tem.*

On behalf of the Crawford County Agricultural Society and the citizens of Conneautville, Hon. H. D. Lowing addressed the Board as follows:

MR. PRESIDENT, FELLOW-CITIZENS, AND FARMERS: It has been made my pleasant duty to bid you welcome. To you who have come from the rich grain fields of York and Lancaster, from the grazing fields and rich meadows of Greene, Washington, and Chester; to you who have come from the rich valleys of the Cumberland, the Juniata, and the Ohio, and to you who have, by your fertile brains and indomitable energies, made the mountain-sides produce their abundance, and to those who come from other societies to contribute to the interests of this meeting, I am authorized to extend to you, in the name of the citizens of Crawford county, a hearty welcome.

In all the corners of this great State there have been large developments, and the wise use of the natural resources deposited by our Creator, and there has been something lying in all these various fields which is profitable for us all to know, and we are here to hear and learn what has been done, and can be done, to preserve the fertility of the soil, to make our farms more productive, our stock more profitable, our homes more comfortable and beautiful, and the farmer's calling the most profitable and ennobling. Many things have been done already to relieve the farmer, the farmer's wife, and the farmer's children from the drudgery and hard toil once inseparably connected with the occupation. Agriculture has passed beyond its first rudiments, and has come to be one of the skilled arts. The time was when the implements of the husbandman were of the rudest kind; when a sharpened stick, with a little iron upon the point, was the plow; when the forked sapling constituted the frame-work of the whole. The time was when the ax, and hoe, and flail, and sickle, and hatchel, and flax-break were the chief instruments out of doors, and when the hatchel, the spinning-wheel, and the loom made the music for the kitchen and the parlor. Then bone, and muscle, and the powers of endurance were the chief factors. But times have changed, and nowhere has the change been greater than in the machinery and equipments of the farm and the varied accomplishments of the thrifty tillers of the soil. Now enlightenment counts for more than strong arms, and knowledge and skill for more than giant frames and skillful farming. It is true that almost any one can plow, and sow, and reap a field after a fashion; but the question is how to manage a farm, and how to work our farms so as to make them pay. And another, and a still more difficult problem in process of solution, is how to make a farm a financial success, and, at the same time, a means of the highest social, intellectual, and religious culture, and the farmer's home a school for the development, and education, and training of the brightest minds, and the dwelling-place of the happiest and noblest of mankind. To do this, we have much to learn, and we are here, as I understand the object of this meeting, to learn how to make improvements. The farmer must be somewhat of a scholar; he must be something of a scientist; he must be something of an artist; he must become familiar, in some way, with some of the great laws of nature; he must know something of the nature of the soil he is working, and the latitude and longitude of his location, and the characteristics of the soil which is being worked. He does not want to be experimenting with orange groves in Vermont, or apple trees in Florida; he does not want to be waiting for showers in the summer time in the arid regions of Colorado or Arizona.

In order to be an accomplished and successful farmer, one must be somewhat of a naturalist, and have some knowledge of plants and animals, and know how to use machinery as well as the skilled mechanic. As an economist, he must turn to some good everything that grows on his premises, and prevent the growth of everything that will not count, so as to make some profit out of every rood of ground. Before the farmer, then, who owns an acre, or who rents an acre of ground, there is an open door for improvement, so as to make his home a little paradise upon the earth.

But the richest field in the past, and the one capable of the largest improvement, and one in which he can sow and reap in all seasons of the year, and in all weathers, and enlarge to any extent, and which will yield the largest results, is the field which we are here to cultivate—it is the mind, the intellect, the soul.

Then, gentlemen, in conclusion, I say our minds and our hearts are open to receive information. We are here to learn the results of your investigations, your observation, and your practical experiments. Into this field you are welcome, and if you make two good ideas live and grow where one grew before, you will be public benefactors, and you will be held in grateful remembrance by those who wish to make the farmer's calling a cultured and ennobling profession. We are aware that, in order to do all these things, there must be improvement in the farmer's library; improvement in the kitchen, and in the parlor, as well as in the barn-yard, and grain fields, or orchards. While the farmers are sending to the ends of the earth, and bringing to their stables the choicest animals and the choicest seeds for the field, with the choicest scions for the orchard and vineyard, let us remember that the minds of his wife and children are capable of a thousand-fold more growth and improvement than these things which "perish with their using." But let him bring to his home the garnered wisdom of the best men and women now living, and who have lived to some good purpose in former times. From the farmers' homes of this land have gone out the greatest divines, the greatest jurists, the bravest soldiers, and the most skilled inventors as well as the most pushing business men, the ripest of scholars, and the most stalwart and wise statesmen, and there are more to follow. Then, let us keep in mind that the raising of fine stock, the growing of abundant crops, and the building of beautiful homes are only the means to a higher end—the education of ourselves and our families for the noblest and highest purposes for which mankind has been created.

On behalf of the Board, Prof. DAVID WILSON, Vice-President, replied as follows:

LADIES, FELLOW-CITIZENS, AND MEMBERS OF THE BOARD: The State Board of Agriculture has not come to Conneautville to teach you agriculture, but to contribute whatever we may be able, in the way of knowledge and progress, and tell you something of what we and other agriculturists have done in other places. In passing along, yesterday, in the cars, I was struck with the kind of country which you are happy to occupy here. I was surprised to find so much level ground and so many extended valleys, and at the same time so much fertile land. Both the name of your town and the appearance of your country indicate a comparatively new settlement and new improvements. The name of the town carries us back to the time when the Indian roamed over this country; but it is evident now that enterprise and an enterprising spirit runs through this section. We are pleased to see the evidences of thrift and enterprise which every building and farm indicate along the railroad to this town, although we can see evidences of the primeval forest, and there is even the old oak still standing in your town, evidently one of the giants of olden days.

But we have come to encourage you in your agricultural efforts, and assist you in raising the farmer and his wife and family to that condition of dignity in society to which he is entitled, and which he ought to occupy, and might have occupied long since if he had been disposed to advance his interests as other interests have been advanced. It is time that farmers should look carefully to their own interest and welfare, and to the success of their own business, and the improvements of the agricultural interests of the State. The farm is the foundation of everything we have, we draw all, substantially, from the soil. Besides, the best men we have come from the country; the best business men of every kind of the cities and towns, endowed with wisdom, endurance, pluck, and energy have been, and still are, supplied from the country. Every year men come to the large cities and towns to keep up the supply; the men who are needed for these various employments, and the men who are engaged there.

I suppose of the primeval forests standing here there are yet a number of thousands of acres. You have great facilities here. You have also the benefit of the example and experience of the older parts of the State. For instance, in Lancaster county they have the fourth generation there, while here you are living almost in the first houses erected. You can at once get the benefit and advantage of all the previous experience and knowledge which the other parts of the country have gained; and you can almost at once elevate yourself to the high condition that a hundred years' experience have wrought.

It was my privilege, a few weeks ago, to attend a meeting in Huntingdon county, where the valleys are hidden by mountains; and yet the industry and thrift of the people of Huntingdon county have made those valleys to almost literally flow with milk and honey. I have not been in a richer part of country than Sinking Valley, yet it is almost entirely unknown beyond her own people. Here you have no broad mountains, but the country is intersected by navigable streams and railroads the latter number of which surprises me. As you know, we had no railroads in olden times. You have advantages in this respect that you can reap and enjoy, and make applicable with far less labor and time than has been done heretofore; and with the energy and past thrift and push, and your ability and industry, as indicated by the spirit of your people, you will bring about great results. Now, we feel encouraged from this, and we believe our proceedings will be interesting to you, and of some advantage.

Above all, we wish you to feel that you are engaged in a noble profession. We may say much about other kinds of business and industry; but the farmer's life is the business of the world. It is from the rural country that you must draw your statesmen, your merchants, and your soldiers, sooner or later, for the natural tendencies of the populations of cities is to grow weaker and weaker, and pass away. As the old poet remarked:

"When civilization leaves the earth,
Her last streaks will be upon the mountains
Of the country."

We have to say that you have a glorious inheritance here to work upon, and you have the means of support, and influence and power all around you which we see you are endeavoring to profit by. We have heard of your fine horses, and the general thrift of your country, and we hope to learn more of it, and a great deal while we are here. We hope that our meeting will be of interest to you, and that we will be benefited as well as yourselves by our intercourse with you.

On motion, the CHAIR appointed Messrs. Roland, Gates, and Eves, a committee to receive and report upon the credentials of members-elect, and of delegates from agricultural organizations.

Minutes of previous meeting partially read, when, on motion of Mr. OLIVER of Crawford, further reading was dispensed with.

On behalf of the Committee on Grasses and Fodders, Hon. N. F. UNDERWOOD, chairman, presented a report; after which, Miss JENNIE WHITESIDES, of Harmonsburg, presented a large number of specimens of the grasses of Crawford county, and explained the nature and value of each. The general subject was discussed by Messrs. Foresman, Underwood, Gates, Clopper, Miller. Zerr, Oliver, Smith, Moore, Whitmore, and Miss Whitesides.

On behalf of the Committee on Dairy and Dairy Products, Mr. REEDER of Bucks presented a full report. After discussion, Mr. GATES of Venango offered the following:

WHEREAS, Relief has come to the makers of genuine dairy butter by the passage of an act in Congress regulating the manufacture and sale of oleomargarine, or imitation butter; therefore,

Be it resolved, That the Board heartily approve the act passed by Congress, believing it to be the only effective legislation that could be enacted.

Resolved further, That we tender our gratitude, in behalf of the makers of genuine butter, to all Representatives in Congress who supported that measure.

After discussion by Messrs. Gates. Miller, Colvin, Foresman, Herr, and Thornton, further action was postponed until the afternoon session.

On motion, adjourned until 1.30, P. M.

WEDNESDAY AFTERNOON, *October 13, 1886.*

Board called to order at 1.30, P. M., by Prof. David Wilson in the chair.

Discussion of Mr. Gates' resolution (postponed at close of morning session) resumed.

Mr. HERR moved to strike out all except the preamble and last resolution, and add the "President of the United States," to the last resolution. After discussion by Messrs. Reeder, Herr, Oliver, and

Hiester, the motion of Mr. Herr was adopted, and the resolution agreed to as follows:

WHEREAS, Relief has come to the makers of genuine dairy butter by the passage of an act by Congress regulating the manufacture and sale of oleomargarine, or imitation butter; therefore

Be it resolved, That we tender our gratitude, in behalf of the makers of genuine butter, to the President of the United States and to all Representatives in Congress who supported that measure.

A report from the Committee on Cereal Crops was read by Mr. HERR, of Clinton, chairman, and ordered to be incorporated with the proceedings of the Board.

On motion of Mr. FORESMAN of Lycoming, a committee was appointed to prepare resolutions expressive of the feelings of the Board in relation to the Governor. The CHAIR named Messrs. Foresman, Hale, Zerr, Roland, Frederick, and Garretson, as such committee.

At the request of Mr. OLIVER, chairman, the report of the Committee on Apiary and Bee Culture, was postponed until the annual meeting.

The Committee on Credentials then reported the following delegates as present, with proper credentials from their respective organizations:

Spring Grange, No. 263, S. B. Lawrence and L. Prussia; from Centre Road Grange, No. 502, C. A. Bostler, George V. Maning, W. C. Graham, C. Brooker, and A. A. Potter; from the Union Agricultural Society of Warren County, D. B. Jagger, Secretary; from the Central Agricultural Society of Crawford County, H. M. Cutshall.

On motion of Mr. OLIVER of Crawford, all new and miscellaneous business was postponed until Thursday morning session.

On motion, Dr. W. S. ROLAND of York then read an essay on "Agriculture and Farm Management," which elicited discussion from Messrs. Foresman, Maning, Lowing, Sever, Hale, Oliver, Whitmore, Thornton, Garretson, Wilson, and Zerr.

Mr. GEORGE SPITLER then read an essay on "What Farmers ought to Know," and Mr. GATES of Venango, on "Some Things that Farmers should take a Greater Interestin, and why."

Mr. REEDER of Bucks then called for the report of the Committee on Useful Birds, when Hon. C .C. MUSSELMAN, chairman, reported that the committee were not prepared, and asked that they be discharged from a further consideration of the subject. After discussion by Messrs. Roland, McDowell, and Musselman, the committee were excused from making a report, but the Board declined to discharge the committee.

On motion of Mr. REEDER of Bucks, new business was then taken up, when, on motion of Mr. McDOWELL of Washington, the Committee on Legislation was permitted to retire for consultation.

On motion of Mr. FORESMAN of Lycoming, the invitation of Powell Brothers to visit the stock farms at Shadeland was accepted for Thursday afternoon, and Mr. Oliver was requested to notify them of the decision of the Board.

On behalf of the Committee on Legislation, Mr. McDOWELL of Washington reported that they asked to be excused from making any report at this meeting.

On motion, the committee were excused as requested.

Messrs. Eves and Smith were excused from further service after the morning session of Thursday.

On motion of Mr. **FORESMAN**, Mr. **SMITH** of Luzerne presented a report as a delegate to the National Agricultural Congress.

On motion of Mr. **OLIVER**, it was decided that in view of the absence of several of the essayists, the Board would consolidate the programme for Thursday, and finish it before the noon adjournment.

On motion, adjourned until 8, P. M.

WEDNESDAY EVENING, *October 13, 1886.*

Board called to order at 8, P. M., Vice President Wilson in the chair.

Dr. **GEORGE W. ATHERTON**, President Pennsylvania State College, addressed the meeting upon the subject of the "Education of American Farmers."

Hon. **GEORGE W. HOOD** read an essay on "The Legal Rights and Duties of Landlords and Tenants."

The address and essay were listened to by a large and apprectative audience.

On behalf of the special committee appointed at a former session, Mr. **FORESMAN** of Lycoming county reported as follows:

WHEREAS, By virtue of his office as Governor of Pennsylvania, His Excellency becomes the President of the State Board of Agriculture;

And whereas, This is the last meeting of the Board which is likely to be held during his term of service as Governor, it is fitting that there should be a proper expression of the high appreciation entertained of his services by the Board; therefore,

Be it resolved, That we sincerely regret the severance of the official relations of the Hon. Robert E. Pattison with the Board, made necessary by the expiration of his term of office, and that we hereby express our cordial thanks for his punctual and regular attendance, and great interest shown at the several meetings, often at great personal sacrifice and inconvenience, and also for his uniform courtesy and fairness while occupying the chair.

(Signed)
D. H. FORESMAN,
WM. S. ROLAND,
JACOB G. ZERR,
ISRAEL GARRETSON,
E. W. HALE,
PHILIP FREDERICK,
Committee.

Adjourned until Thursday at 9, A. M.

THURSDAY, *October 14, 1886.*

Board called to order at 9, A. M., by Vice President Wilson in the chair.

On motion, H. M. **CUTSHALL** of Guy's Mills read an essay on "The Rotation of Crops," the subject-matter of which was discussed by Messrs. Spitler, Cutshall, Oliver, Foresman, Keller, Witmore, Zerr, Greenley, Musselman, and Secretary.

On motion of Dr. **ROLAND**, a committee of three, consisting of Messrs. Roland, McDowell, and Atherton, were appointed to draft resolutions expressive of the feeling of the Board in regard to the reception which they had received at the hands of the citizens of Conneautville and of Crawford county.

Dr. **ELWOOD HARVEY** then addressed the Board on the subject o "Breeding Horses," and at the close of the address answered all questions which were asked.

Miss **JENNIE WHITESIDES** then read an essay on "The Flora of Crawford County," and illustrated her essay by a number of prepared specimens representing the leading flowers of the flora.

Mrs. **W. G. THOMAS** read an essay on "Woman's Work," which was listened to with great attention.

JOSEPH BEATTY POWELL then addressed the Board on the subject of "Farmers' Homes," when, on motion, adjourned to meet at 8, P. M.

THURSDAY EVENING, *October 14, 1886.*

Board called to order at 8, P. M., by Vice President Wilson in the chair.

In the absence of the Secretary, Eastburn Reeder was chosen secretary *pro tem.*

On behalf of the Committee on Resolutions, Dr. W. S. **ROLAND**, chairman, offered the following, which, after discussion, were unanimously adopted:

Resolved, That the thanks of the Board are hereby tendered.

1. To the Crawford County Agricultural Society for their complete and convenient arrangements for the present meeting.
2. To the Powell Brothers, for their invitation and courtesy in throwing open to the Board a very interesting and instructive exhibition of their stock of different breeds of horses, and their fine herds of Holstein and Devon cattle.
3. To Messrs. Wetmore and Oliver for the exhibiton of their fine herds of pure Devons.
4. To M. W. Oliver, the resident member of the Board, for his untiring energy in providing for the entertainment of the members.
5. To the essayists of the vicinity for the valuable papers contributed to the programme, and for the part which they and others took in the discussion.
6. To the citizens of Conneautville and vicinity for their many acts of kindness, and for their attendance and interest at the meetings of the Board.

(Signed)
W. S. ROLAND,
JOHN McDOWELL,
GEORGE W. ATHERTON,
Committee.

Rev. S. H. **WALLACE** of Sharpsville, Pa., then addressed the meeting on the subject of "Brains, Energy, and Perseverance in Farming."

On motion of Mr. **GARRETSON** of Adams, a vote of thanks was accorded to Mr. Wallace, and his address orderded to be printed in the proceedings of the Board.

Adjourned to meet in Harrisburg at the usual time for the annual meeting.

In addition to these meetings, as shown by the minutes, other meetings and institutes were held at the following times and places, the minutes of which are excluded on account of the limited space allotted to the proceedings of the Board:

Titusville, December 22 and 23, 1885.
Lock Haven, January 21 and 22, 1886.
Honesdale, February 22 and 23, 1886.
Montrose, May 5 and 6, 1886.
Atglen, May 20 and 21, 1886.
Mifflintown, June 1 and 2, 1886.

All of these meetings were largely attended by the farmers of the respective districts, and the interest manifested clearly proves the wisdom of the special appropriation which enables the Board to hold them. Applications have already been made (October 20) for institutes during the coming year, which will more than absorb the amount of funds available for the purpose. A number of our Western States have appropriated for this purpose amounts varying from two to eight thousand dollars, and it is a fact indicative of the value of this class of meetings that we are able to state that in all cases the first appropriation has been followed by a greater one the succeeding year.

The Board has adopted the rule that this fund is not available for holding the meetings of any regularly organized body, but that it must be devoted to the foundation of new organizations; consequently, the number of meetings to be held in any one county during a year has been limited to one, and in order to still further economize the fund, the average expenses of each has also been limited.

EXTRACTS FROM THE ANNUAL REPORT OF THE SECRETARY.

The limited space assigned to the annual and quarterly reports of the Board, forbids the insertion of anything beyond a condensed report on a few of the leading topics which have engaged the attention of the Board and its Secretary during the past year. The same cause has also prevented the collection and publication of our usual crop and live-stock statistics. The Board has the benefit of a well-organized corps of practical reporters so situated as to represent every district of the State, and fully competent to present intelligent and interesting reports upon any and all topics of general interest to the farmer. These reporters (numbering over two hundred) have been furnished with blanks asking for reports upon leading items of interest. Some of these reports have been condensed into tabulated form and are annexed to portions of the report of the Secretary. Other topics of almost equal interest have been omitted for want of space.

In addition to the usual and regular meetings of the Board, large and well attended local farmers' institutes have been held in various parts of the State. The matter collected at these meetings would, if space was afforded, prove of great interest to the farmers of the State, but with our limited resources in this respect they are practically lost to all who do not attend them.

The Cost of Fencing.

For the purpose of obtaining definite data as to the cost of fencing and farm fences in different portions of the State, printed blanks were sent to the official correspondents of the Board, asking for reports upon the following points:

Post and Rail Fence.—Cost of chesnut rails in the rough, per hundred; cost of pointing rails, per hundred; cost of chestnut posts in the rough, per hundred; cost of locust posts, in the rough, per hundred; cost of hewing and mortising posts, per hundred; cost of four-rail fence, per panel, and cost of five-rail fence, per panel.

Worm Fence.—Cost of rails, per hundred, and cost of fence per panel, of five rails and rider.

Board Fence.—Cost of sixteen-foot hemlock fence boards, per thousand; cost of sixteen-foot pine fence boards, per thousand; cost of chestnut posts for board fence, per hundred; cost of locust posts for board fence, per hundred; cost of four-rail board fence per rod, and cost of five-rail board fence per rod.

Wire Fence.—Costs of posts for wire fence, per hundred; cost of putting up five-wire fence per pannel, and total cost per rod of five-wire fence put up.

Some of the counties failed to make any report, and some only made a partial report, embracing some of the items of information asked for. In many cases, the questions were not adapted to the kind of fence used in the neighborhood; in others, stone walls were mainly used. From the reports made we condense the accompanying table, from which we deduce the following general items of information:

That the cost of broad chestnut rails varies from eighteen dollars per hundred in Philadelphia county to three dollars per hundred in Fulton, Greene, and Huntingdon; that the cost of pointing the rails is much less variable than the price, per dundred and varies from one dollar and seventy-five cents per hundred in Indiana and Juniata to seventy-five cents per hundred in Cambria, Clarion, Fayette, Franklin, and Greene.

That the cost of chestnut posts, in the rough, varies from twenty-two dollars per hundred in Philadelphia county to but four dollars and fifty cents in Sullivan, and four dollars and seventy-five cents in Potter.

That the cost of hewing and mortising posts varies from twelve dollars and seventy-five cents in Juniata to but four dollars in Bedford, the latter price, however, being manifestly too low to include the board and wages of a good hand at the work.

That locust posts, in the rough, vary in cost from forty dollars in Adams to fifteen dollars and fifty cents in Cambria.

That the estimated cost, ready to put up, and including materials and labor, of a four-rail post-and-rail fence, varies from one dollar and twenty cents in Philadelphia county, to but thirty-five cents per panel in Fayette.

That the cost of worm fence rails varies from twelve dollars per hundred in Philadelphia to but two dollars in Fulton, (which we think below the actual value or cost.)

That the total cost of a five-rail (with rider) worm fence ready put up and including materials, is found to vary from seventy-five cents in Philadelphia, to twenty-six cents in Greene.

That the cost of sixteen-foot hemlock fence boards varies from thirty dollars in Adams to but seven dollars in Clearfield.

That the cost of sixteen-foot pine fence boards varies from thirty-five dollars per thousand in Adams to but ten dollars in Clarion, a variation of seven dollars per thousand being shown between the pine and hemlock in Lycoming county.

The chestnut posts suitable for a board fence cost seventeen dollars per hundred in Indiana, and but five dollars in Clearfield, Columbia, and Forest, and but four dollars in Crawford.

That locust posts, suitable for the same purpose, cost at the rate of thirty-five dollars in Adams, and but twelve dollars in Clearfield, Dauphin, and Lancaster much of this difference is, however, due to the difference of opinion which exists as tothe size of posts for this purpose. Some of the answers which specified a driven post were excluded from the estimate.

That the cost of a four-rail board fence, including materials and ready to put up, varies from one dollar and forty-five cents in Allegheny to forty-five cents in Westmoreland.

That the cost of a similar fence with five rails varies from one dollar and sixty cents in Allegheny to but fifty-five cents in Potter and Westmoreland.

That posts for a wire fence vary in cost from fourteen dollars in Philadelphia to four dollars in Clearfield and Crawford.

That the estimated cost of putting up a five-wire fence, materials not counted, varies from eight cents per rod in Bradford and Dauphin to thirty cents in Cambria.

From the reports furnished by our reporters, we take the following average of each item of information asked for:

Chestnut rails, (rough,)	$7 00	Hemlock boards, (16 feet,)	$12 79
Pointing rails,	1 05	Pine boards, (16 feet,)	18 25
Chestnut posts, (rough,)	11 34	Chestnut posts, board fence,	9 45
Locust posts, (rough,)	23 87	Locust potts, board fence,	18 00
Hewing and morticing posts,	8 88	Four-rail board fence,	79
Cost of four-rail fence,	63	Five-rail board fence,	90
Cost of five-rail fence,	69	Posts for wire fence,	9 52
Rails for worm fence,	4 72	Putting up wire fence, per rod,	14
Worm fence, per panel,	42	Cost of wire fence, per rod,	60

In a paper recently read at one of the meetings of the Board by Eastburn Reeder, member from Bucks county, he estimates the cost of making an ordinary four-rail post fence, (chestnut,) as follows: Post, twelve cents; rails, ten cents each, or forty cents; total cost of material, fifty-two cents; labor of setting, twenty-four cents; total cost per panel of ten feet, seventy-six cents, as against our average over the whole State of sixty-three cents. In this estimate he gives the cost of hewing and mortising posts at eight cents, and pointing at two cents each, or respectively eight dollars and two dollars per hundred, as against our average of seven dollars and one dollar and five cents per hundred.

Mr. Reeder gives the following itemized estimate of the cost of a four-rail board fence per rod:

Forty feet of hemlock boards, at $20 per hundred,	80	cents.
Two chestnut posts, at $12 per hundred,	24	"
Nails,	1	"
Labor,	5	"
Total cost per rod,	$1 10	

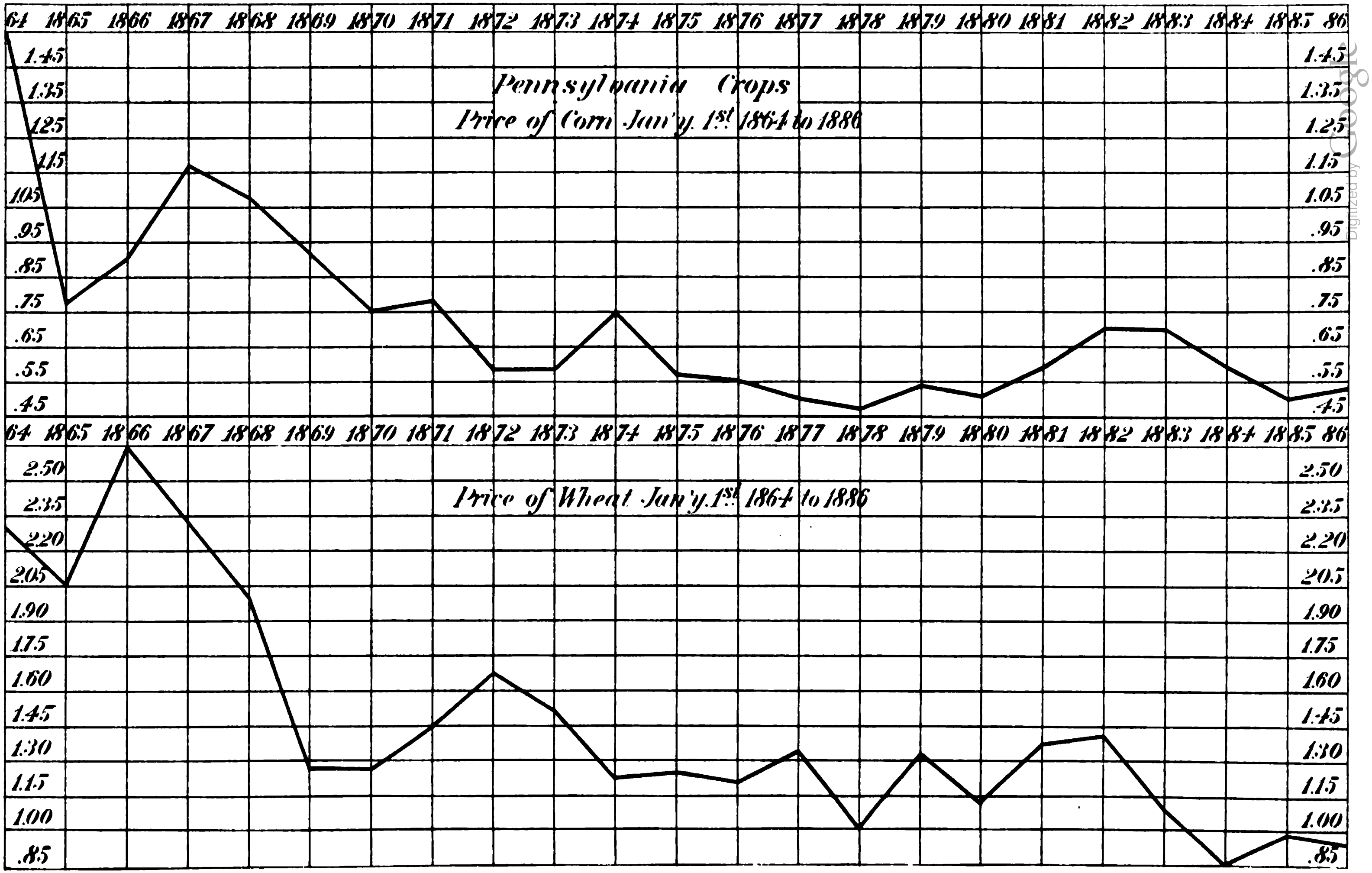
In making a comparison between the figures offered by Mr. Reeder and those which represent the average of the State, it should be remembered that his are from a county in which fencing timber and wages are much above the average of the State, and that his figures will be correspondingly above the State average of cost of fencing.

COST OF FENCING AND FENCING MATERIAL.

COUNTIES.	POST AND RAIL FENCE.							WORM FENCE.		BOARD FENCE.						WIRE FENCE.		
	Chestnut rails in the rough, per hundred.	Pointing rails per hundred.	Chestnut posts in the rough, per hundred.	Locust posts in the rough, per hundred.	Hewing and mortising posts, per hundred.	Cost of four-rail post fence, per panel.	Cost of five-rail post fence, per panel.	Worm fence rails per hundred.	Cost of five-rail worm fence, per panel.	Sixteen-foot hemlock boards, per thousand feet.	Sixteen-foot pine boards, per thousand feet.	Chestnut posts for board fence, per hundred.	Locust posts for board fence, per hundred.	Cost of four-rail board fence, per rod.	Cost of five-rail board fence, per rod.	Posts for wire fence per hundred.	Cost of putting up five-wire fence, per rod.	Total cost of five wire-fence, per rod.
Adams,	$8 00	$1 00	$15 00	$40 00	$10 00	$0 75	$0 80	$7 00	$0 49	$30 00	$35 00	$10 00	$35 00					
Allegheny,	....	....	....	....	....	....	....	8 00	68	16 00	20 00	12 00	20 00	$1 45	$1 60	$15 00	$0 25	$0 85
Armstrong,	....	....	....	....	....	....	....	....	....	10 00	12 00	10 00	....	1 00	1 10	....	25	75
Beaver,	....	....	....	....	....	....	....	4 50	50	....	....	....	....	....	....	....	20	70
Bedford,	4 00	87	15 00	20 00	8 00	60	70	2 50	85	12 50	19 00	15 00	19 00	....	....	13 00	30	1 00
Berks,	7 00	1 00	10 50	....	5 50	43	56	6 00	43	16 00	20 00	8 00	....	80	96	7 00	10	68
Bradford,	....	....	6 00	....	....	....	....	8 00	50	10 00	12 00	6 00	....	60	70	6 00	8	55
Bucks,	12 00	2 00	12 00	....	8 00	76	....	8 00	60	20 00	25 00	10 00	....	....	....	12 00		
Butler,	....	....	12 00		10 00	75	85	....	31	11 00	16 00	12 50	....	1 05	1 19	10 00	15	90
Cambria,	4 00	75	12 50	15 50	6 00	61	71	4 25	82	10 00	20 00	12 50	15 00	1 03	1 16	12 50	30	
Cameron,	....	....	....	....	....	....	....		....	8 00	....	10 00	....	65	72	10 00	....	70
Centre,	5 00	1 00	10 00	20 00	12 00	52	60	4 00	40	10 00	16 00	12 00	20 00	70	78	10 00	....	60
Chester,	10 00	1 50	12 00	....	8 00	90	1 00	8 50	54	17 00	25 00	12 50	....	90	1 05	14 00	....	60
Clarion,	3 60	75	7 00	....	10 00	40	43	3 00	26	3 00	10 00	15 00	....	63	70	15 00		
Clearfield,	5 00	1 50	6 00	20 00	12 00	75	1 00	5 00	50	7 00	10 00	5 00	12 00	....	....	4 00	10	50
Columbia,	6 00	1 00	6 00	....	7 50	50	58	5 00	37	9 00	....	5 00	....	75	81	5 00	12	65
Crawford,	....	....	....	....	....	....	....	3 00	40	8 00	12 00	4 00	....	....	....	4 00		
Cumberland,	6 00	1 00	15 25	35 00	10 00	....	....	5 00	40	12 00	30 00							
Dauphin,	9 50	1 00	12 00	25 00	9 50	82	94	6 75	35	16 00	22 00	9 00	12 00	89	1 02	12 00	8	50
Erie,	....	....	....	....	....	50	60	4 00	50	12 00	....	8 00	....	70	80	8 00	25	70
Fayette,	4 00	75	10 00	18 00	....	35	40	3 00	28	....	....	10 00	18 00	1 25	1 35	9 00	15	75
Forest,	....	....	14 00	20 00	....	....	....	3 00	28	8 00	12 00	5 00	....	75	1 00	6 00	....	55
Franklin,	6 00	75	8 00	35 00	10 00	....	1 10	5 00	39	....	....	10 00	....	....	....	....	....	45
Fulton,	3 00	1 15	10 00	12 00	10 00	....	....	2 00	....	15 50	....	8 00	....	....	....	8 00	....	50
Greene,	3 00	75	15 00	20 00	10 50	47	52	2 50	28		15 00	12 50	17 50	87	1 00			
Huntingdon,	3 00	1 00	10 00		8 50	45	54	2 50	25	14 00	15 00	10 00	20 00	75	85	7 50	12	42
Indiana,	14 00	1 75	18 00	25 00	10 00	90	1 00	8 00	75	12 00	15 00	17 00	....	75	85	11 00	10	60
Juniata,	6 25	1 75	15 00	25 00	12 75	90	95	5 00	47	14 00	18 00	8 50	....	80	90	12 00	20	80
Lackawanna,	....	....	12 00		....	....	....	6 00	45	12 00	....	....	....	80	90	12 00	10	65
Lancaster,	8 00	1 00	12 00	18 00	10 00	66	77	7 00	60	15 00	22 00	8 00	12 00	69	75	8 00	10	55

COST OF FENCING AND FENCING MATERIAL—Continued.

COUNTIES.	POST AND RAIL FENCE.							WORM FENCE.		BOARD FENCE.						WIRE FENCE.		
	Chestnut rails in the rough, per hundred.	Pointing rails per hundred.	Chestnut posts in the rough, per hundred.	Locust posts in the rough, per hundred.	Hewing and mortising posts, per hundred.	Cost of four-rail post fence, per panel.	Cost of five-rail post fence, per panel.	Worm fence rails, per hundred.	Cost of five-rail worm fence, per panel.	Sixteen-foot hemlock boards, per thousand feet.	Sixteen-foot pine boards, per thousand feet.	Chestnut posts for board fence, per hundred.	Locust posts for board fence, per hundred.	Cost of four-rail board fence, per rod.	Cost of five-rail board fence, per rod.	Posts for wire fence per hundred.	Cost of putting up five-wire fence, per rod.	Total cost of five-wire fence, per rod.
Lawrence,		$1 00	$15 00	$25 00	$6 50	$0 75	$0 80	$8 00	$0 45	$14 00	$16 00	$15 00	$20 00	$1 10	$1 20	$12 50	$0 21	$0 75
Lebanon,	$10 00	1 11	17 00	30 00	10 00	80	95	6 00	25	...	30 00	10 00		1 20	1 30	8 50	10	78
Lycoming,	5 00	87	10 00	25 00	7 50	50	55	4 50	42	8 00	15 00	6 00	18 00	55	62			
Mercer,	2 75	1 05	15 00		10 00	40	50	2 75	35	12 00	20 00	12 00	...	90	1 00	12 00	10	85
Mifflin,	5 00	1 00	7 00	25 00	7 50	48	50	3 00	29	12 00	14 00	7 00	...	57	65	7 00	12	54
Montgomery,	14 00	2 00	20 00	...	8 75	1 02	1 04	7 50	47	18 00	30 00	16 00	...	1 07	1 19	14 00	9	53
Northampton,	8 00	1 00	10 00	20 00	5 75	57	65	5 00	42	16 00	24 00	10 00	...	88	1 01	10 00	10	40
Northumberland,	6 00	1 15	12 00	28 00	9 00	45	61	4 00	38	...	...	12 00	...	80	90	10 00	...	48
Philadelphia,	19 00	1 50	22 00	25 00	10 00	1 20	1 50	12 00	75	...	...	14 00	16 00	...	...	14 00		
Potter,	5 00	1 00	4 75	...	5 75	55	67	3 50	80	...		7 00	...	45	55	7 00	10	50
Snyder,	10 00	1 00	16 50	...	12 00	65	77	7 00	...	20 00	25 00		...	...	...		10	59
Somerset,	2 50	87	10 00	...	8 00	50	60	2 25	55	14 00	...	10 00	...	80	90	7 00	10	44
Sullivan,	...	...	4 50	...	...	48	58		...	...	...		...	51	58		9	41
Susquehanna,	...	1 00	5 00	...	...	...	...	3 00	35	10 00	20 00	5 00	...	75	1 00	5 00	...	50
Tioga,	...	...	...	...	...	...	...	5 00	38	...		10 00	...	65	71	10 00	...	38
Union,	9 00	57	12 00	25 00	5 50	...	...	5 00	35	11 00	13 50	13 50	19 00	75	85	10 00	...	60
Venango,	12 00	1 50	12 00	...	...	...	...		...	10 00	24 00	12 00	...	85	93	12 00	11	70
Warren,	3 50	95	7 00	...	7 50	45	55	3 00	33	9 00	14 00	7 00	...	65	70	7 00	12	80
Wayne,		...	6 00	...	...	...	...		...	10 00	...	6 00	...	43	55	6 00	...	40
Wyoming,	6 00	1 00	10 00	...	...	75	80	5 00	57	12 00	16 00	10 00	...	75	85	10 00	10	70
York,	5 00	50	8 00	20 00	9 00	45	54	4 00	35	16 00	17 50	7 00	15 00	82	92	7 00	10	55



Pennsylvania Crops

Price of Corn Jan'y. 1st 1864 to 1886

Price of Wheat Jan'y. 1st 1864 to 1886

Osage Hedges and Their Cost.

During an extended examination into the cost of fencing in various parts of the State, the subject of osage orange hedges was incidentally brought into the question, and, as a means of obtaining reliable information as to their proper treatment and cost, a circular letter was addressed to a number of practical farmers who have each a considerable amount of this kind of hedge upon their farms. Information was asked for upon the following divisions of the question: Number of plants required per hundred rods; cost of plants per hundred; cost of preparing the ground; cost of setting plants; cost of trimming and treatment the first year; cost of same the second, third, and fourth years. At four years old it was assumed that the hedge, if properly cared for, should turn ordinary farm stock, and be a fence in the common acceptance of the term; after the fourth year the only item asked for was the probable cost of the one or two annual trimmings necessary. Each one was also requested to note any items of interest as to treatment and planting.

The number of plants required for one hundred rods of hedge is variously stated by our correspondents at from two thousand five hundred to four thousand. Our own experience, duplicated by that of a number of those who replied, would lead us to place the proper number at three thousand five hundred, which will allow one to each five inches. The cost per hundred is stated at from thirty to fifty cents. From our own experience, and for the purpose of adapting our figures to all portions of the State, we consider the maximum figures as the safest, and place the cost, per hundred, at fifty cents.

In estimating the cost of setting the plants, our correspondents vary from three dollars to five dollars per hundred rods, more than three fourths of them giving the latter figure, but none going higher than this.

The first year's trimming and treatment include sufficient working, hoeing, &c., to keep the hedge row free from all weeds and rubbish. This our authorities variously estimate at from one dollar to four dollars, and we place the average at two dollars and seventy-five cents.

The trimming and treatment (including hoeing, &c.,) for the second, third, and fourth years are, on an average, estimated at four dollars, four dollars and fifty cents, and five dollars respectively; some going as high as six dollars, and some as low as three dollars. The cost of the subsequent annual trimmings is averaged at six dollars, and should be done twice each year, one about harvest and once during the fall.

After condensing and arranging the answers as given by all of our correspondents, we obtain the following figures, as showing the cost of one hundred rods of the hedge at four years old, or when it is ready to turn common farm stock:

Three thousand five hundred plants, at fifty cents per one hundred,	$17 50
Preparing ground for hedge,	8 50
Setting plants already trimmed in the nursery,	4 75
Trimming and cleaning during the first year,	2 50
Trimming and cleaning during the second year,	4 00
Trimming and cleaning during the third year,	4 50
Trimming and cleaning during the fourth year,	5 00
Total cost of hedge at four years old,	$46 75

The correspondence developed the following items which, as arranged under their respective heads, may be thus condensed:

Plants.—It is not advisable in any case to use plants more than one year old. The theory that time is gained by using two or three year old plants is erroneous. That with yearling plants, if it has not already been done in the nursery, it will pay to assort them into lots of the same size and comparative growth, and planting each size together; that unless the soil has been prepared to an unusual depth, all of the root below six to seven inches should be taken off either at the nursery or before planting; that the tops should be reduced to not more than three eyes each. A number of our correspondents express the opinion that many hedges are permanently injured by allowing too many shoots to start from the stem during the first year, and that the stem should be cut down, or the young shoots rubbed off, to prevent this. A weak plant placed between two vigorous ones will usually leave a gap, whereas weak plants, if planted in the same portion of the hedge, will do as well, at the end of the fourth year, as the others.

Planting and Preparing the Ground.—All agree that many hedges have been ruined by improper or insuffcent preparation of the ground before planting; an error of this kind can never be rectified by subsequent treatment. One practical correspondent writes that "one half of the efficiency of the hedge is in the preparation of the ground." If the ground for the future hedge is so situated that it can be cultivated and cared for as a row of corn, and is along one side of the cornfield, the task is comparatively an easy and cheap one; but if it is not so situated and must have special and separate treatment, it is more expensive. By far the best hedge on the farm of writer was so situated that the row could be cultivated with corn for one year previous to the final preparation and planting the hedge. Thus no sod had to be contended with, and after careful plowing, a deep furrow was drawn in the line of the hedge, and after the plants had been placed against the land side of the furrow, the soil was drawn in with hoes and compressed around the plants by the foot. This plan is preferable to the use of the "dibble" for making holes. This makes the earth compact around the plants, and if the soil should be a little too wet, inflicts an injnry which may readily cause the loss of a year's growth to the plants. The distance asunder for the plats is variously stated by our correspondents at from five to fourteen inches. Some advocate a double row of plants with the plants, one foot apart in rows one foot asunder. In this case the plants are to be so placed as not to come opposite to each other in the rows. After considerable practical experience, we are satisfied that plants five to six inches apart, in single rows, will give the best satisfaction and will be most readily kept clean. The double row plan involves more or less hand hoing at a time when the labor can be illy spared from the pressing duties of the farm. On ordinary ground, with a single row of plants five inches apart, there should be no difficulty in making an efficient hedge in four years, and on good soil, one which will, at that age, turn any ordinary farm stock. No fertilizer should be applied unless it be to such portions of the line as are, from local causes, poorer that the balance of the row; high knolls or shallow places in the soil may be manured, but it is usually the trouble that the plants grow *too fast* and not that they do not grow fast enough, many otherwise good hedges being spoiled by the anxiety of the owners to get rapid growth, and "force" a fence too soon.

Trimming and After Treatment.—We find that, after the hedge has been grown four years and has made a perfect fence, its subsequent treatment varies with each correspondent. One thing, however, is evident in nearly every report, viz: that a majority of hedges are permanently injured by the desire to obtain a fence or complete hedge too soon. A delay of a year or two during the early life of a hedge may add fifty per cent. to its effectiveness. If allowed to make too much permanent progress in any one year, the error cannot be rectified by any ordinary treatment, and in fact can be remedied only by cutting back to the point at which the error was made. As a rule, nothing should be done to repress the growth during the first year; in fact, but little need be done but to watch and see that no more that two branches or shoots start from each plant; if too many are allowed to grow they will injure the plant and prevent proper development. If a plant fails to grow, one of the stalks of the adjointing plant may be bent over so as to fill the gap. If several plants fail to start, it will be best to sink a large flat stone close to each growing plant and thus prevent the roots from affecting the growth of the new plants, which must be set out during the next spring. Unless the plants are very large, a gap may be filled up in this way; but without protection from the roots of vigorous adjoining plants, a newly set plant will seldom thrive. After the third or fourth year the hedge will need little or no cultivation, its shade being ample protection against the growth of weeds. All large weeds should be promptly taken out and the formation of seeds prevented. During the spring of the second year, all shoots may be cut back to a uniform height of nine inches. The growth of the second year may be trained either way so as to fill up small gaps. The labor of this year will mainly be directed to keeping all weeds and grass from the row. In the fall it is best to rake off all leaves, weeds, &c., which may otherwise form a harbor for mice during the winter. The third spring all growth may be cut back to a uniform height of eighteen inches. The third year the same process may be gone through with as during the second. During the fourth year, but little harrowing or hoeing will be needed and the whole care should be directed to filling up gaps and making a perfect hedge. At the commencement of the fourth year the hedge will have a height of twenty-seven inches, and the growth of the fourth year should be taken off to the height designed for the hedge, always remembering that it is much more likely to become higher after subsequest clippings than it is to remain at the same height. Thirty-six to forty inches will usually be found high enough to turn ordinary farm stock. If not found to be sufficient, it is easy to raise the height during the cutting of any subsequent season. The writer has osage hedges forty inches high through or over which no farm stock has yet gone, and thus far no necessity has been found for increasing the height.

Plashing and Layering.—Some of our correspondents have made allusion to the importance of layering at the end of the first year. This is usually done by laying down every other plant in the line of the hedge, and confining it about six inches from the ground by "plashing" or intertwining it with adjoining ones. Another plan involves the laying down of every plant or shoot before growth commences the second spring. The necessity of this is, to say the least, doubtful. In our own experience we have never found any necessity for it. The only advantage claimed is that it makes the hedge closer at the bottom; the disadvantage is that you lose one year of progress. For situations where a close hedge is desirable this plan may have its special advantages, but for an ordinary farm fence it is not necessary; for a neglected hedge, or one full of gaps, we know of no better treatment than careful layering or plashing. Hedges so poor as to be comparatively worthless may, by this plan, be made effective. Large plants thus layered will make very rapid growth, and will soon regain the lost time, so that there is not so much lost by the practice as at first appears.

Trimming.—Much of the efficiency and life of the hedge will depend upon the trimming after the fourth year; none of the side shoots near the bottom should be cut. Many hedges are spoiled by making them narrow near the base, and, by letting in the rays of the hot summer sun, the lower branches, which should protect the roots and large stalks, are killed. Nothing will benefit a hedge injured in this way except cutting all off to within seven to eight inches of the ground and starting afresh. The best shape is that of the letter A, with the top cut off to the width of about one foot; let it be as wide at the base, especially on the road side, as possible. After the seventh year, some of the lower branches may be shortened in, but not too severely. A total width of four feet at the base is better than less, and will add years to the effectiveness of the hedge. The trimming can be most *economically* done by going over the hedge twice each season, and by this plan much less time and labor will be required. The first cutting may be made just before or during harvest, and the second just before the leaves fall in the autumn. It is true that after such a late cutting the twigs will winter-kill more, but in a vigorous hedge this is not material. The trimming can be rapidly done with a common corn knife, especially when the branches are soft. If trained in the way we have described, and cut at the times named, a good man can rapidly put a hedge into proper shape.

Prices of Farm Products.

No small proportion of the correspondence which has reached the office of the Board during the past year has been directed to the present low prices of all kinds of farm products, and a number of suggestions have been offered as to how the difficulty may be remedied. So far as we have noted them, we think that all of these proposed plans are impracticable, mainly because they fail to take into consideration the true cause of the low prices which prevail.

If there is one truth in political economy more prominent than another, it is that (especially in farm products) the seller is at the mercy of the purchaser, and that farmers, of all others, are most dependent upon a favorable condition of trade and manufactures. If other trades are dull, the farmer is one of the first to feel the effects, because the artisan, being deprived of all, or a portion of, his wages, buys less of the absolute necessities of life, and gives its luxuries up altogether. No one calling is more dependent upon the laws of supply and demand, and none sooner feels the falling off in the demand, for many of his products cannot profitably be stored for a rise in the market or to await better times.

Most of our correspondents attribute the present condition of the market to the discrimination in freight rates as in favor of the Western producer, and while this as a cause occupies a prominent part in the problem, yet we think that there are other causes which should by no means be lost sight of in attempting its solution.

The price of wheat is not so much regulated by the size of our national crop as by the needs of Europe and the foreign demand. So long as we produce a surplus, the price of our whole crop will depend upon what the markets of the world will afford us for that surplus. For a number of years past our production has been increasing in a much greater ratio than our consumption. Thousands who were consumers in Europe have landed on our shores, and, passing west, have become large producers instead of consumers, and have thus done double duty towards producing low prices. Their effect in either direction can have but one tendency, and that is to lower prices. A careful examination of the question will, we think, convince any one that this ratio of increased production to increased consumption has more than reached its maximum, and that for several years we have been increasing our consumption in a greater ratio than our production; in other words, that, while most of our best agricultural lands have been taken up and settled, we have gone on increasing our consumers in other parts of the country. In many parts of the West, we find that, while the acreage remains without any material change, there has been (through exhaustion of the soil) a falling off in the average yield of the crops. Many of the Western States, which but a few years ago were large producers for the European market, are now purchasers for home consumption. Many of our farmers can well remember the cry that once went forth to the effect that Ohio, Indiana, and Illinois would produce grain for the world, and depress prices below a profitable mark, and yet none of these States now produce enough wheat for their own consumption. How long will it be before the same state of affairs will exist in the still more distant Western States? Twenty years more of progress, as favorable as the past two decades, will find the center of population pushed westward to a point which will absorb much more of the surplus than at present.

During the past ten years, our principal competitor in the wheat market of the Old World has been Russia, but within the past five years a new and more formidable competitor has been found in India, where cheap lands, coupled with cheap labor, are producing wheat at prices which startle even our Western producers, and that, too, with a limit of production which is only confined by the ability to transport the crop to the seaboard, and this difficulty is being rapidly removed by the use of English capital in the construction of railroads from the interior to the seaboard, enabling the producer to land his grain in the docks of Liverpool at lower rates than from our Atlantic seaboard. In India, vast areas are each year being brought under cultivation, and we are now brought face to face with the fact that the foreign market is no longer dependent upon us for its shortage, and that the world is increasing its wheat production in a much greater ratio than it is its wheat consumption, and low wheat means low prices for all kinds of farm products.

Quite a number of our correspondents assume that the present prices of farm products are without precedent in our history as a nation, but the records will disprove this theory, and that without going very far back for the dato. From a reliable authority, we quote the following prices which prevailed in 1815, alongside of those of to-day, and the reader will notice that there is still a point at which we might have been worse off.

	1815.	*1886.*
Wheat, per bushel,	$0 44	$0 99
Oats, per bushel,	15	41
Corn, per bushel,	20	46
Barley, per bushel,	25	80
Butter, per pound,	12	28
Cheese, per pound,	6	10
Eggs, per dozen,	5	12
Cows, per head,	15 50	40 00
Hay, per ton,	5 00	12 50
Straw, per ton,	4 00	10 00
Sheep, per head,	75	2 25
Farm labor, per month,	8 00	12 50

On the other hand, we note the following comparison of the prices of products which the farmer must purchase:

	1815.	*1886.*
Nails, per pound,	$0 12	$0 04
Blankets, per pair,	15 00	7 50
Calico, per yard,	25	06
Salt, per bushel,	1 50	25

One of our best writers on political economy, in referring to prices of farm produce at the present time, as compared with those which prevailed seventy years ago, uses the following language:

> "But, after all, such comparisons prove little. It is impossible for farmers now to live as their fathers did. The conditions are all changed. The world has moved onward and every one must keep step with the procession. The comparison should not be made between the farmers of to-day and the farmers of the last century or of the dark ages. The farmer has the right to ask how the rewards of his calling compare with the reward of other callings. Does the capital he has invested and the labor he expends bring adequate returns, and enable him to live as well and educate his children as well, as men in other occupations do, who make a like expenditure of money and labor? This is a question with two sides, certainly may farmers justly investigate it without being open to the charge of faint-heartedness or discontent."

But in comparing their industry, in its profits, with others, it is important that the farmer should not neglect to give proper credit for the board of himself and family, and for the many privileges which he can only enjoy upon the farm. He should remember that his profit is the surplus *after* household expenses have been first deducted, while from that of the merchant, the family or living expenses are yet to be deducted. Another important item in arriving at a proper understanding of the comparative profits of any of the different avenues open to capital and labor, is that the *average* profits of the business should be considered. It will not do to take extreme cases, such as the Vanderbilts and the Astors, to show the profits upon capital invested in mercantile callings; the average must be taken. What, then, are the *average* profits in any one class of business? Will it exceed three per cent. upon *all* of the capital? Good judges and shrewd observers unhesitatingly say that it will not reach this average. How, then, will this interest upon the investment compare with the profits of agriculture?

PRICES OF FARM PRODUCTS AND LIVE STOCK, JUNE, 1886.

COUNTIES.	Wheat, per bushel.	Rye, per bushel.	Oats, per bushel.	Potatoes, (old,) per bushel.	Hay, (clover,) per ton.	Hay, (timothy,) per ton.	Butter, per pound.	Ewes, (average,) per head.	Lambs, (average,) per head.	Horses, (average.)	Mules, (average.)	Cows, (average.)	Poultry, (dressed,) per pound.
Adams,	$0 80	$0 54	$0 33	$0 70	$7 00	$9 00	$0 15	$2 50	$2 50	$130 00	$125 00	$30 00	. . .
Allegheny,	90	65	38	60	10 00	15 00	18	3 00	2 50	175 00	175 00	40 00	$0 12
Armstrong,	90	65	40	40	9 00	12 00	8	2 50	2 00	115 00	125 00	20 00	8
Beaver,	80	50	30	40	9 00	10 00	8	2 25	2 00	85 00	80 00	30 00	6
Bedford,	87	63	39	35	12 00	14 00	9	2 75	2 25	100 00	100 00	25 00	5
Berks,	85	58	33	60	10 00	12 00	12	3 75	2 50	100 00	85 00	26 00	12
Blair,	85	75	41	44	11 00	12 25	18	3 15	3 00	115 00	110 00	28 00	11
Bradford,	90	70	40	45	10 00	12 00	14	2 25	2 25	125 00	120 00	25 00	10
Bucks,	90	65	40	80	10 00	12 00	25	4 00	3 50	137 00	125 00	40 00	12
Butler,	90	60	50	50	10 00	14 00	10	2 25	2 00	100 00	90 00	22 50	12
Cambria,	85	75	40	45	10 00	12 00	12	2 50	2 50	130 00	125 00	30 00	12
Cameron,	75	60	50	45	10 00	14 00	20	3 00	2 50	125 00	120 00	30 00	12
Carbon,	80	58	50	42	11 10	13 25	17	2 75	2 25	110 00	100 00	24 00	9
Centre,	87	60	30	35	10 00	13 50	10	2 25	2 25	100 00	125 00	20 00	8
Chester,	87	59	42	40	10 00	12 50	30	3 50	3 25	130 00	125 00	30 00	14
Clarion,	95	73	49	50	10 00	12 00	10	2 25	2 00	120 00	120 00	23 00	. . .
Clearfield,	90	70	45	60	10 00	12 00	20	3 00	2 25	100 00	100 00	25 00	15
Clinton,	84	50	32	50	8 00	10 00	15	2 50	2 50	100 00	90 00	23 00	10
Columbia,	85	58	38	40	10 00	12 00	12	2 50	2 50	150 00	175 00	25 00	. . .
Crawford,	90	50	45	40	9 00	10 00	12	3 00	2 50	125 00	125 00	30 00	12
Cumberland,	80	40	35	40	10 00	12 00	10	2 50	2 25	90 00	95 00	25 00	12
Dauphin,	83	64	35	60	10 00	13 00	15	4 00	2 75	130 00	140 00	35 00	11
Delaware,	87	61	44	54	10 75	14 00	28	4 00	3 25	140 00	135 00	35 00	12
Elk,	82	54	48	52	9 75	12 50	11	2 75	2 25	100 00	100 00	25 00	9
Erie,	95	80	38	70	6 00	7 50	14	4 00	3 00	85 00	95 00	25 00	12
Fayette,	85	60	35	50	10 00	12 00	9	2 25	2 00	87 50	80 00	28 00	5
Forest,	95	75	48	75	12 00	15 00	15	2 50	2 50	120 00	120 00	28 00	8
Franklin,	82	60	35	35	10 00	12 00	8	3 50	3 00	130 00	125 00	25 00	10
Fulton,	75	50	33	25	8 00	10 00	7	3 00	2 25	90 00	85 00	20 00	8
Greene,	80	60	30	40	16 00	16 00	8	2 50	2 00	100 00	125 00	25 00	10
Huntingdon,	83	60	35	35	12 00	15 00	10	2 00	2 00	150 00	125 00	20 00	10
Indiana,	90	60	30	40	8 00	10 00	10	3 00	2 00	150 00	125 00	30 00	12
Jefferson,	95	75	48	60	10 00	12 00	12	2 50	2 25	100 00	100 00	20 00	. . .
Juniata,	75	55	32	25	8 00	10 00	12	2 50	2 50	130 00	125 00	25 00	10
Lackawanna,	95	60	45	60	12 00	15 00	20	3 50	3 25	125 00	120 00	30 00	15
Lancaster,	85	65	31	40	9 00	11 00	12	4 00	4 00	150 00	150 00	35 00	10
Lawrence,	90	50	35	75	10 00	12 00	10	2 25	2 25	90 00	100 00	30 00	10
Lebanon,	83	60	34	60	12 00	17 00	16	. .	. .	150 00	125 00	25 00	. . .
Lehigh,	90	68	40	65	12 00	16 00	16	3 00	3 00	140 00	150 00	30 00	14
Luzerne,	90	59	43	55	12 00	13 50	20	. . .	. .	120 00	110 00	24 00	9
Lycoming,	85	65	35	50	10 00	12 00	15	3 00	3 00	135 00	140 00	30 00	14
McKean,	82	58	41	48	11 00	12 75	12	. . .	. . .	110 00	100 00	22 00	9
Mercer,	85	60	35	50	6 00	8 00	10	2 00	2 00	130 00	125 00	30 00	9
Mifflin,	85	65	30	40	6 00	7 00	15	2 50	2 25	125 00	135 00	30 00	10
Monroe,	82	54	40	40	9 00	11 50	10	. . .	.	120 00	105 00	26 00	9
Montgomery,	85	60	43	50	14 00	16 00	25	3 00	5 00	175 00	200 00	30 00	25
Montour,	85	65	40	50	8 00	12 00	12	4 00	2 50	125 00	100 00	25 00	10
Northampton,	95	62	38	70	10 00	15 00	14	3 00	2 50	150 00	140 00	25 00	12
Northumberland,	80	60	32	45	10 00	15 00	15	3 00	3 00	130 00	175 00	25 00	10
Perry,	84	52	39	40	11 00	13 50	18	2 75	2 25	100 00	100 00	27 00	9
Philadelphia,	87	60	42	75	12 00	17 00	25	. . .	. . .	200 00	150 00	37 50	16
Pike,	82	58	44	60	10 00	12 00	14	. . .	. . .	125 00	. . . .	27 50	8
Potter,	1 00	70	40	75	10 00	12 00	14	2 25	2 50	120 00	125 00	28 00	8
Schuylkill,	89	67	47	54	10 00	11 75	17	3 00	2 50	105 00	100 00	24 50	9
Snyder,	80	55	32	35	7 50	9 00	12	2 25	2 25	125 00	93 00	30 00	8
Somerset,	90	75	35	30	12 00	12 50	15	2 50	2 25	130 00	125 00	25 00	10
Sullivan,	90	75	45	50	10 00	12 00	13	4 00	3 25	150 00	125 00	30 00	14
Susquehanna,	90	50	45	50	8 00	10 00	15	3 00	2 50	135 00	125 00	25 00	8
Tioga,	85	65	40	60	8 00	11 00	15	2 50	2 50	150 00	125 00	25 00	8
Union,	83	63	31	37	7 00	11 00	13	.	. .	100 00	110 00	21 00	8
Venango,	90	50	42	80	8 00	10 00	14	2 25	2 00	150 00	150 00	32 50	10
Warren,	95	70	45	55	8 00	10 00	14	2 25	2 00	90 00	100 00	30 00	15
Washington,	90	70	35	50	8 00	9 00	16	6 00	5 00	100 00	75 00	35 00	10
Wayne,	98	70	45	75	10 00	12 00	13	3 00	3 00	150 00	130 00	25 00	10
Westmoreland,	90	66	38	70	10 00	14 00	25	4 00	3 00	110 00	90 00	25 00	. . .
Wyoming,	90	58	38	50	10 00	14 00	15	3 50	3 00	100 00	100 00	25 00	12
York,	. . .	. . .	. . .	. . .	. . . .	. . . .	. . .	. . .	. . .	. . . .	. . . .	. . . .	. . .

FARM WAGES AND BOARD—1886.

COUNTIES.	By the month—whole year with board.	By the month — summer months with board.	By the month—whole year without board.	By the month — summer months without board.	By the day—regular work with board.	By the day—regular work without board.	By the day—transient work with board.	Harvest wages with board.	Household help, (female,) with board.	Estimated cost per day of boarding farm hands.
Adams,	$10 00	$15 00	$18 00	$20 00	$0 50	$1 00	$0 75	$1 25	$1 25	$0 45
Allegheny,	15 00	18 00	22 00	25 00	80	1 30	1 00	1 30	2 50	50
Armstrong,	15 00	18 00	17 50	20 00	75	1 00	1 00	1 25	2 00	40
Beaver,	10 00	12 00	15 00	17 00	75	1 00	75	1 00	2 00	40
Bedford,	10 00	12 50	14 00	16 00	50	85	60	1 00	1 25	30
Berks,	12 00	14 00	14 00	18 00	75	1 00	1 00	1 20	1 25	30
Blair,	13 75	15 00	18 50	22 50	75	1 10	1 00	1 35	1 75	32
Bradford,	15 00	18 50	18 00	25 00	75	1 00	1 00	1 25	2 25	45
Bucks,	13 00	18 00	20 00	25 00	1 00	1 25	1 00	1 50	2 00	50
Butler,	14 50	15 50	25 00	30 00	75	1 25	1 00	1 50	2 50	50
Cambria,	14 00	18 00	28 00	32 00	75	1 00	1 10	1 50	1 50	30
Cameron,	16 00	18 00	27 00	30 00	1 00	1 25	1 00	1 25	2 75	50
Carbon,	12 75	14 75	20 00	22 50	90	1 10	95	1 30	1 75	40
Centre,	12 00	15 00	18 00	20 00	90	1 10	1 00	1 25	1 50	35
Chester,	13 00	15 50	18 25	22 00	92	1 05	1 00	1 37	1 75	40
Clarion,	15 00	16 00	18 50	20 00	75	1 00	75	1 10	2 00	30
Clearfield,	16 00	20 00	28 50	35 00	75	1 25	1 00	1 25	2 10	40
Clinton,	11 00	18 00	18 00	20 00	65	90	1 00	1 00	1 50	25
Columbia,	12 00	14 00	20 00	24 00	75	1 00	1 00	1 25	1 50	30
Crawford,	14 00	17 00	20 00	25 00	75	1 25	75	1 50	2 00	40
Cumberland,	10 00	12 00	17 00	20 00	60	85	90	1 25	1 50	35
Dauphin,	12 00	15 00	20 00	22 50	65	90	75	1 25	1 75	25
Delaware,	13 50	16 25	18 50	23 00	90	1 10	78	1 50	1 87	40
Elk,	10 75	13 50	18 75	27 30	65	1 00	1 00	1 15	1 50	35
Erie,	15 00	20 00	25 00	20 50	1 00	1 25	1 25	1 50	2 00	30
Fayette,	10 00	12 00	15 00	18 50	75	1 00	75	1 00	1 50	40
Forest,	12 50	18 00	18 50	22 50	1 00	1 50	1 50	2 00	1 50	50
Franklin,	10 00	12 00	15 50	18 00	60	90	75	1 25	1 25	30
Fulton,	9 50	12 00	15 00	20 00	50	75	50	1 50	1 25	35
Greene,	12 00	15 00	18 00	21 00	75	1 00	75	1 25	1 50	25
Huntingdon,	12 00	16 00	15 00	20 00	75	1 00	75	1 50	1 50	40
Indiana,	12 00	15 00	20 00	25 00	75	1 00	1 00	1 25	1 50	45
Jefferson,	14 50	17 50	20 00	22 50	75	1 10	1 00	1 50	2 00	40
Juniata,	12 00	15 00	18 00	21 00	65	75	75	1 20	2 00	35
Lackawanna,	16 50	20 00	22 50	30 00	1 00	1 25	1 30	2 00	1 50	37
Lancaster,	13 00	15 00	20 00	22 50	65	1 00	75	1 25	2 00	35
Lawrence,	13 00	15 50	17 50	22 50	1 00	1 25	1 10	1 30	1 75	45
Lebanon,	15 00	17 50	18 50	22 50	75	1 15	1 00	1 35	2 00	45
Lehigh,	12 50	15 00	18 00	23 00	75	1 00	1 00	1 25	2 00	50
Luzerne,	17 50	19 50	21 00	25 00	80	1 10	1 00	1 30	1 50	40
Lycoming,	15 00	18 00	20 00	25 00	75	1 10	1 00	1 75	1 50	35
McKean,	12 50	14 50	18 75	20 00	70	1 05	1 00	1 30	2 00	33
Mercer,	15 00	18 00	25 00	28 00	1 00	1 25	1 25	1 50	1 50	50
Mifflin,	10 00	12 50	18 00	20 00	60	1 00	75	1 12	1 35	40
Monroe,	10 50	13 50	15 50	17 50	70	1 00	75	1 10	2 50	35
Montgomery,	14 00	19 00	23 50	23 50	75	1 10	1 25	1 50	1 50	35
Moutour,	11 00	14 00	18 75	21 50	70	1 15	1 10	1 50	1 50	45
Northampton,	12 50	15 00	22 50	25 00	1 00	1 25	1 30	1 50	2 00	36
Northumberland,	12 50	15 00	17 50	19 50	75	1 00	1 00	1 25	2 00	42
Perry,	12 50	15 00	16 50	18 50	70	1 00	90	1 30	1 75	35
Philadelphia,	18 00	22 00	25 00	30 00	80	1 25	1 00	2 25	3 00	40
Pike,	11 00	13 50	20 00	22 50	70	1 00	1 00	1 75	2 00	45
Potter,	14 00	18 00	22 50	25 50	1 00	1 40	75	1 50	2 00	40
Schuylkill,	15 75	18 75	24 50	26 75	1 00	1 35	1 00	1 25	1 87	45
Snyder,	12 00	13 50	18 00	20 50	65	80	75	1 10	1 50	40
Somerset,	10 00	15 00	20 00	25 00	1 00	1 25	1 20	1 25	2 00	35
Sullivan,	15 00	18 50	21 50	24 50	1 00	1 25	1 20	2 00	2 50	35
Susquehanna,	13 50	14 75	18 00	22 50	1 00	1 50	1 25	1 50	2 25	40
Tioga,	14 00	18 00	21 50	25 00	63	1 00	1 00	1 25	2 00	45
Union,	12 50	13 75	17 50	22 50	78	1 05	95	1 25	1 35	37
Venango,	13 00	16 00	17 50	22 00	1 00	1 25	1 00	1 25	2 00	30
Warren,	13 00	16 00	22 00	25 50	75	1 25	1 00	1 50	2 00	30
Washington,	17 50	19 00	22 50	25 00	1 00	1 25	1 25	1 50	2 00	45
Wayne,	12 00	16 00	20 00	24 50	75	1 00	1 00	1 50	2 00	35
Westmoreland,	13 50	16 50	21 00	24 50	75	1 10	95	1 37	1 75	45
Wyoming,	14 50	16 25	22 50	24 50	75	1 20	1 00	1 50	1 75	40
York,	13 50	16 50	22 00	25 00	80	1 20	1 00	1 45	1 87	42
Average,	$13 07	$15 23	$19 66	$23 13	$0 79	$1 11	$0 96	$1 36	$1 68	$0 39

Farm Wages and Farm Hands.

Owing to the very general complaint on the part of the farmers of the State, that the present wages of farm hands is out of all proportion to the prices of farm products, an examination of the subject was made through our official reporters in each county, and a large amount of data obtained, which is hereunto appended.

In the collection of data, we have confined ourselves and official reporters as much as possible to the following channels:

First.—By the month, with and without board, and with constant work all of the year, and with work only during the seven or eight "summer months."

Second.—By the day, with regular work and board throughout the whole year; by the day, with constant work, but without board; and by the day as wanted, as during threshing and other busy times, with board when employed.

Third.—Wages during harvest.

Fourth.—Wages of household help (female) by the week with board.

Fifth.—Estimated cost of boarding farm hands.

As will be noted from the accompanying table, the following deductions may be drawn:

By the month, with constant work the whole year and board: The wages paid varies from nine dollars and fifty cents in Fulton and ten dollars in Adams and Franklin to eighteen dollars in Philadelphia, the average of the State being thirteen dollars and seven cents, which is nearest reached in Bucks, Chester, Delaware, Lancaster, Lawrence, Susquehanna, Venango, Westmoreland, and York.

By the month, for the summer months, with board: The amount varies from twenty-two dollars in Philadelphia to but twelve dollars in Beaver, Cumberland, Fayette, Franklin, and Fulton, the average being fifteen dollars and twenty-three cents, which most nearly corresponds with the amount paid in Adams, Blair, Centre, Dauphin, Lancaster, Lehigh, Northampton, Perry, and Somerset.

By the whole year, the hand to board himself: The amount paid varies from twenty-five dollars in Philadelphia to fourteen dollars in Bedford and Berks, the State average for this class of hands being nineteen dollars and sixty-six cents.

By the month for summer months only, the hand to board himself: The variation in this class of workmen is from thirty dollars in Philadelphia to but sixteen dollars in Bedford and eighteen dollars in Franklin, the average of the whole State being twenty-three dollars and thirteen cents.

By the day, constant work, with board: Will be found to vary from one dollar in Bucks, Cameron, Erie, Forest, Lackawanna, Lawrence, Mercer, Northampton, Potter, Schuylkill, Somerset, Sullivan, Susquehanna, Venango, and Washington, to sixty cents in Cumberland, the average of the State being seventy-nine cents.

By the day, constant work, the hand to board himself: Varying from one dollar and fifty cents in Forest to but seventy-five cents in Juniata and Fulton, the average being one dollar and eleven cents for the State at large.

Transient work, with board: Varies from one dollar and thirty cents in Lackawanna to seventy-five cents in Adams, Beaver, Clarion, Crawford, Dauphin, Fayette, Franklin, Greene, Huntingdon, Lackawanna, Monroe, Montgomery, Schuylkill, and Somerset, the average being ninety-six cents.

Harvest wages, with board: We find to vary from two dollars and twenty-five cents in Philadelphia to one dollar in Beaver and Bedford, the average being one dollar and thirty-six cents for the State.

Wages paid to household help (female) on farms, with board: This our reports show to vary from three dollars in Philadelphia to one dollar and twenty-five cents in Adams, Bedford, Berks, Franklin, and Fulton, the State average being one dollar and sixty-eight cents per week.

Estimated cost of board of farm hands per day: This varies in accordance with situation and the market value of the waste or unmarketable products of the farm. Our reporters in Bucks, Allegheny, Butler, Cameron, Forest, Lehigh, and Mercer place the cost per day at fifty cents, while on the other extreme thirty cents in Bedford, Berks, Cambria, Clarion, Columbia, Erie, Venango, and Warren, the average of the whole number of reporters being thirty-nine cents per day, which corresponds very nearly with the estimates of former years.

Nearly all of our correspondents and reporters are practical men, and many of them, in forwarding their reports, state that the wages of farm hands is out of proportion to the present prices of farm products, and that farming in its present condition will not warrant such prices. Some claim that if the present proportions between the relative price of farm labor and farm products is maintained, the battle between capital (agricultural) and labor must soon take on a new phase. From the official records of the Board, we compile the following table, which shows the relative wages received by farm laborers during the time which the Board has been in existence, and which would indicate that there has not been a great decrease in wages, while there has been a falling off in all kinds of farm products.

	By the month, whole year, with board.	By the month, summer months, with board.	By the month, whole year, without board.	By the month, summer months, without board.	By the day, regular work, with board.	By the day, regular work, without board.	By the day, transient work, with board.	Harvest wages, with board.	Household help, with board.	Estimated cost of board per day.
1877 . . .	$12 30	$15 10	$20 87	$26 07	$0 80	$1 15	. . .	. . .	. . .	$0 35
1878 . . .	11 24	14 05	18 41	24 07	75	95	. . .	$1 08	. . .	36
1879 . . .	10 58	13 40	17 44	21 25	63	88	. . .	. . .	. . .	32
1880 . . .	11 97	14 90	18 32	22 35	71	98	. . .	. . .	$1 55	30
1881 . . .	12 45	15 49	24 98	23 00	70	1 01	$0 82	. . .	. . .	48
1882 .	13 70	17 04	19 48	23 47	75	97	87	1 39	1 80	41
1886 . . .	13 07	15 23	19 66	23 13	79	1 11	97	1 36	1 48	39
Average,	12 19	15 03	19 30	23 33	74	1 01	89	1 27	1 67	35

Any attempt to institute a comparison between the price paid for farm labor and the market value of farm or farm products is attended with great difficulty, from the fact that we have no standard which can be taken as a safe basis of the calculation. The writer has a distinct remembrance of guaranteeing harvest hands that they should not receive *less* than the price of a bushel of new wheat per day, and as much more as others were paying; harvest hands, at present, would not be willing to accept the price of wheat as a basis upon which to calculate their per diem. The same difficulty will be met in taking any other kind of grain as a basis, for all are liable to these fluctuations of price, which are incident to the laws of supply and demand. In many of the counties of England, it is a custom to hire hands for farm work at wages equivalent to the price of a fixed number of bushels of grain, and in most cases barley is taken as the basis of the calculation. This plan is not, however, calculated to suit the requirements of our farm hands, and hence there seems to be no other plan but to fix the wages at a given money rate at the commencement of the service.

Applying the basis of the market price of a bushel of wheat to our table, we attain the following result, with the wages paid a farm hand by the month, with regular work all of the year, with board included, as represented by the first column of the table: In 1879, he would have required ten bushels of wheat; in 1880, the same amount; in 1881, the number of bushels required to pay him was eleven and one-fourth bushels; and in 1882, it was eleven and one half; in 1886, it would require fifteen bushels to pay his monthly wages.

In this connection it should be remembered, that while this has been a year of almost unprecedented low prices, it has been one in which it was exceedingly difficult to get good hands in many portions of the State.

Some of our correspondents have claimed that if the present proportion between the wages paid farm hands and those of farm products is maintained a few years longer, there will be a contest between capital and labor on the farm as well as in the shop. In this connection it may be well to quote the following from the address of Hon. Galusha A. Grow, at the Scranton meeting of the Board, in which he said:

> A disagreement between the employer and the employé as to the wages of labor is no more a war between capital and labor than a disagreement between the merchant and his customer, as to the price of articles offered for sale is a war between the producer and the consumer. There can be no war, or even conflict, between capital and labor when their real interests are rightly understood. They are mutually dependent on each other, and neither can accomplish any great result without the other. Of what use is labor, beyond the supplying of mere physical wants by the cultivation of the soil, without capital to furnish transportation to market for its products, as well as for the development of all industries; and of what use would capital be without labor?
>
> In the old system of mining in Mexico a peon dug the ore deep down in the earth, and filled a sack of raw hide with the material, and throwing the sack over his shoulder, with a leather strap passing across his forehead to hold it while he used his hands in climbing a single upright pole, with notches like stairs, cut in it for his feet, and on reaching the top, would empty the sack of ore into a larger one suspended on either side of a donkey, which transported it along a zigzag path down the mountain side to a smelting furnace, erected by the nearest stream of water. Capital drives a tunnel through the mountain; lays an iron or steel track, and puts on it a locomotive and cars into which the peon loads the ore as he digs it; and in as many minutes as it took hours before, transports the ore to the furnace; and the peon is transformed from a drudge, doing the work of a beast of burden, into a man with wages sufficient to make a home comfortable. Instead of the hovel of the peon, side by side with the stable of the donkey, there spring up comfortable dwellings; homes of happy childhood.
>
> So in all the pursuits of life—in order to accomplish the best results for the individual happiness of all, capital and labor must go hand in hand, mutually dependent on each other.

And so it is with the farm labor of our State, as compared with that of fifty years ago. The introduction of improved machinery has enabled a single man, with brains, to do the work of several, one man, by the substitution of machinery and horse-power, cutting and binding more wheat now in a day than a dozen could have done fifty years ago, and while it is true that labor has not decreased in the price paid, yet it now accomplishes, for the same outlay, much more than formerly.

It may be, and has been claimed, that it now costs as much to harvest and thresh out an acre of wheat as it did twenty-five years ago. This may be correct, but, at the same time, we must take into consideration the fact that we could not now obtain a sufficient number of men to enable us to return to the ways of our grandfathers. So many other avenues involving less out-door exposure and shorter hours of labor have been opened that farm labor is much less plentiful than formerly. With the introduction of improved machinery, we also need men who are educated to its use, and for this some consideration must be paid as in the other branches of business wherein brains are substituted for muscle.

The Guenon System of Selecting Cows.

Of the many tests and experiments made and carried out by direction of the Board, none has attracted more attention on the part of the practical farmers and dairymen of the State than the test of the Guenon system, made by direction of the Board in 1878, and published in the annual report of that year. The edition of twenty-eight thousand five hundred copies entirely failed to supply this demand, and the report was re-published by private enterprise, and several editions have been sold.

At a farmers' institute, held at Atglen, Chester county, Pa., May 20 and 21, 1886, under the auspices of the State Board of Agriculture, George Blight, Esq., of Philadelphia, delivered an address upon the value and importance of the Guenon system as a means of selecting cows. In the discussion which followed the address, the Secretary of the Board of Agriculture suggested that if the system possessed the value and practicability attributed to it, it could readily be shown by a public test, and if any one who knew exactly what his cows had done would permit them to be used for a test, the Board of Agriculture would arrange and conduct a trial upon such a plan as would insure a fair and impartial test of the system. Thomas J. Phillips, of Atglen, Pa., having for a number of years kept a careful account of the milk of his dairy of thirty-two cows, offered them for the test.

While the primary object of the test was to prove or disprove the value of the Guenon system, it was decided that other supposed "good points" should be included. Some suggested that color was one of the points which should not be lost sight of; another point alluded to was the color of the skin on the inside of the ear and at the end of the tail; the importance of the position of the "curl" on the back was deemed of great importance by others; hence, in arranging the blanks to be used at the test, those for the examiner were arranged to contain the following items: Number of animal, age, color, color of skin at end of tail, color of skin on inside of ear, shape of horns, direction of horns, shape of neck, position of curl on the back, class and order according to the Guenon system, months in milk, quarts per day when fresh, quarts per year, and quality of the cow. In the blanks for the "owner's estimate," all of these, except those relating specially to the Guenon system, were again used. Mr. Blight was not allowed to hear the report of the owner, and was compelled to base his judgment entirely upon the outward marks, he never having seen any of the animals before. The use of such general terms as "very good," "excellent," and "good," was avoided, and both examiner and owner gave the estimated yield in quarts per day and per year. It is but just to Mr. Blight to state that all of his previous examinations had been made with reference to the yield of butter, and without reference to the yield in milk, and that this was one of his first attempts to reduce the system to actual quarts given in a year.

In order to give every possible means of obtaining a fair and full test, Mr. Phillips carefully weighed the milk given by a number of the cows, May 28, and the result of this is given in a separate column. This test was, however, somewhat under the actual yield of the cows, as it was made just after and during a cold rain, and after a hail storm.

In his examination, Mr. Blight publicly gave the class and order to which he assigned the animal, and also stated her probable yield per day when fresh, the number of months during which she would probably milk. After all had been thus examined, the owner gave similar information, based upon what he knew of the capabilities of each animal, and without reference to Mr. Blight's estimates. In the table the two are given side by side, so as to enable each reader to decide for himself how much value can be attached to the system, of course bearing in mind the fact that Mr. Blight is an expert, and that an amateur should not expect to attain as close results as are expected from one who has devoted so much time to the study of the system.

Explanation of the Table.

In the third column, (that of color,) R., signifies red; Br., brindle; B· W., black and white; R. W., red and white; and W., white. In arranging the figures for the color of the skin inside of the ear and at the end of thetail, ten was taken as a maximum, representing the highest color (yellow) usually met with, and one the minimum, representing the absence of this color. In fixing the position of the "curl" on the back, ten was taken as a maximum, showing it in a position further back, and one as the minimum, placing it between the shoulders. In both of these cases, a decrease of the numbers from ten indicates a weakness in the special point, and the amount of this falling off is to be gauged by the decrease in the number. In fixing the number of months in milk, it was assumed as a starting-point that the cow would, on an average, go one year from calf to calf, and the figures are based upon this assumption. It is admitted that in practice this time is too long, but it being necessary that some such data should be fixed so that both examiner and owner should estimate upon the same basis, this was assumed as sufficiently correct. In order to assist the practical reader in arriving at a conclusion, we have introduced a column showing the data at which each animal was fresh. We also give a column showing the actual yield per day of most of the cows, as ascertained by weighing the milk on May 28, six days before the test.

TEST OF THE GUENON SYSTEM OF SELECTING MILK COWS.

Examination by GEORGE BLIGHT, Esq., Philadelphia, Pa., under the superintendence of the Secretary of the Pennsylvania State Board of Agriculture. Cows the property of Thomas J. Philips, Atglen, Chester county, Pa. Examination made June 3, 1886.

	EXAMINER'S ESTIMATE.										OWNER'S ESTIMATE.				
						CLASSIFICATION ACCORDING TO THE GUENON SYSTEM.									
Number of animal.	Age.	Color.	Color of end of tail.	Color of inside of ear.	Position of curl on back.	CLASS.	Order.	Months in milk.	Quarts per day when fresh.	Quarts per year.	WHEN FRESH.	Months in milk.	Quarts per day when fresh.	Quarts per year.	Yield by actual test, May 28, 1886.
1	5	R.,	9	9	8	Flanders, ...	3	10	12	1,800	January 2, 1886, ...	10	12	1,800	22 pounds.
2	12	Br.,	9	8	8	Flanders, ...	1	10	20	2,100	September 6, 1885, ...	10	15	2 000	17 pounds.
3	10	R.,	8	8	8	Flanders, ...	2	10	20	2,400	January 5, 1886, ...	10	16	3,000	30.25 pounds.
4	8	R. W.,	8	8	8	Flanders, ...	4	8	14	2,000	February 7, 1886, ...	11	14	2 200	23.5 pounds.
5	9	R. W.,	8	9	8	Flanders, ...	1	10	20	2,800	November 23, 1885, ...	10	10	2,200	26 pounds.
6	12	R. W.,	8	8	8	Flanders, ...	2	10	20	2,500	March 11, 1886, ...	9	10	2,000	
7	6	R. W.,	9	10	8	Flanders, ...	3	9	16	2,000	October 2, 1885, ...	10	12	2,200	20.75 pounds.
8	12	R. W.,	4	4	2	Curveline, ...	4	8	15	1,600	July 9, 1885, ...	9	8	1,600	
9	8	Br.,	9	10	8	Flanders, ...	1	10	20	3,000	May 9, 1886, ...	12	18	3,000	33 pounds.
10	9	R. W.,	8	8	8	Selvage, ...	3	9	15	1,900	October 7, 1885, ...	9	12	2,200	10 pounds.
11	12	B. W.,	9	10	8	Flanders, ...	1	10	20	2,500	December 9, 1885, ...	9	11	1,800	24 pounds.
12	7	R.,	8	8	3	Flanders, ...	3	8	12	1 900	May 5, 1886, ...	11	15	2,800	33.5 pounds.
13	3	R.,	8	8	8	Selvage, ...	2	9	12	1 800	January 30, 1886, ...	10	8	1,800	
14	4	R.,	7	8	8	Selvage, ...	1	9	20	2 400	April 14, 1886, ...	10	8	1,800	23.75 pounds.
15	3	R.,	7	8	6	Flanders, ...	2	10	20	2,500	May 3, 1886, ...	11	12	2 400	31 pounds.
16	10	R.,	9	8	2	Flanders, ...	3	9	12	1,700	February 10, 1886, ...	10	10	2,000	29 pounds.
17	12	R. W.,	6	8	8	Left Flanders, ...	2	10	20	2 100	March 24, 1886, ...	10	10	2,000	
18	3	R. W.,	5	7	8	Selvage, ...	1	9	20	2 200	May 27, 1886, ...	11	12	2,400	
19	13	W.,	7	9	4	Double Selvage, ...	1	9	20	2 300	January 30, 1886, ...	9	8	1.500	
20	5	W.,	8	8	8	Flanders, ...	3	9	15	1,900	February 1, 1886, ...	8	12	2 000	26 pounds.
21	6	B. W.,	7	7	4	Curveline, ...	2	10	18	2,400	March 25, 1886, ...	10	12	2,400	32.25 pounds.
22	8	R. W.,	7	7	8	Selvage, ...	2	9	18	2 200	January 1, 1886, ...	10	9	2,000	
23	9	R. W.,	7	8	7	Flanders, ...	3	9	18	2 200	December 31, 1885, ...	10	12	2,500	25 pounds.
24	12	R.,	6	9	6	Flanders, ...	1	10	20	2 300	July 6, 1885, ...	11	12	2,400	
25	13	R. W.,	7	8	8	Flanders, ...	2	10	15	2 200	December 28, 1885, ...	11	12	2,500	23.5 pounds.
26	8	R. W.,	7	8	8	Curveline.	3	8	12	1.600	December 9, 1885, ...	10	10	2,000	
27	13	R.,	6	7	8	Flanders, ...	1	10	20	2.300	August 30, 1885, ...	11	15	3,000	7 pounds.
28	12	B. W.,	6	8	3	Curveline, ...	1	10	20	2 500	April 14, 1886, ...	9	12	2,200	29.5 pounds.
29	8	R. W.,	8	8	4	Flanders, ...	2	10	18	2 300	March 30, 1886, ...	10	10	2,000	28 pounds.
30	3	R.,	8	10	6	Curveline, ...	2	8	16	2,000	January 30, 1886, ...	10	10	2 000	
31	13	R. W.,	9	9	6	Flanders, ...	1	10	20	2,500	April 15, 1886, ...	10	10	2.000	
32	8	. . . . . .	8	8	8	Selvage, ...	2	8	20	2,200	May 1, 1886, ...	10	10	2,000	

Explanation of the System.

This system, as originated by M. Guenon, a native of France, is based upon the shape and position of what he has styled "ears" or "quirls," upon the posterior portion of the thighs of the animals. These ears or quirls Guenon arranged into ten leading classes, to which he gave names, to a certain extent indicative of their shape, as follows :

First class, or Flanders.
Second class, or Left Flanders.
Third class, or Selvage.
Fourth class, or Curveline.
Fifth class, or Bicorn.
Sixth class, or Double Selvage.
Seventh clas, or Demijohn.
Eighth class,or Square Escutcheon.
Ninth class, or Limousine.
Tenth class, or Horizontal.

Each of these ten classes he sub-divided into ten orders, thus making the system consist of one hundred distinct parts or divisions; to these he added a number of markings, which he termed "bastard marks," with which the ten divisions, as above, were supposed to include within their number any cow which might be found. Each *class* was better than the following one, and each *order* better than the one following in the *same* class; but under the system, it is possible that the first *order* of the third *class* may be as good or better than the third *order* of the first *class*. When in the tabulated list, Mr. Blight's report assigns a cow to "Curveline fourth," it is to be understood that she comes in the fourth *class* of the system, and in its fourth order. If he assigns her a place as "Flanders, No. 1," it indicates that when judged by the system, she is a cow of the first class and first order, or one of the very best.

It should be distinctly understood, in publishing an account of tests of this system, that the Board, as a body, is not thereby committed to an indorsement of its correctness. Upon this point the Board is divided in opinion, and even its members who are practical dairymen do not agree as to the benefits to be derived from its study and practice. We deem it to be our duty to submit the evidence to the farmers and dairymen of the State, and leave it for them to decide as to its value when brought into practical use.

Willis P. Hazard, Esq., who is well known as one of the foremost and best exponents of the system, thus writes in relation to it:

> The science of Guenon is no new thing—not a thing of a day. It was adopted, after ample testing, by the leading agricultural societies, and by the government of France. The ablest scientific men have tested and approved of it in all countries, yet until within a few years it has never been popularized in this country. The translation of Guenon's book by N. P. Trist gave only a portion of it, and at that time his system was crude and incomplete, and it has never been altered or brought up to Guenon's revised rules and alterations to this day. It still maintains the numerous divisions and sub-divisions, amounting to two hundred, into which Guenon separated it with the exactness of an enthusiast, making it very forbidding, and dismaying many—nearly every one—from taking hold of it. In his later issues, Guenon simplified it very much, making more distinct classes, and reducing the number of orders, and giving a separate treatise on bulls. In order to simplify it much more, I have prepared a hand-book, and with so many illustrations as to enable any intelligent man to become master of it in thirty days. It is published in cheap form to advance the knowledge of a system so beneficial to every purchaser of a cow. It is forwarded free by mail to any one who remits me fifty cents for the work. It contains, also, the complete report of the Pennsylvania Commission, which shows the comparative statements of the owner and the Commission, neither knowing what the other said about the cows until they were handed in for publication.
>
> In 1878-79, this Commission acted under the orders of Governor Hartranft of Pennsylvania, to test the system, and whether its reliability would recommend it for popular use. Their report of the examination of two hundred cows of various breeds, shows a successful statement of their qualities to be about ninety per cent. The mode of proceeding was to examine the cow and make notes of her points as to quantity, quality, and time of milking. This was independent of the owner, and the record was kept by

the secretary. A similar statement from the owner, who knew, of course, exactly what his cows would do, and generally made beforehand, was afterward handed to the secretary of the Commission, who transcribed the two statements ready for publication in parallel columns. These statements were then placed with the originals before the owners, who compared them, and certified to their correctness as originally taken down, and they were ready for publication. This plan prevented any collusion, or any chance of altering to assimilate the two statements. The examinations were made only by the escutcheons, and no statements were allowed to be made by any one to the Commission until after their judgment and record had been made. Some of the cows were blanketed, so that nothing more was shown than is to be seen in the drawings illustrating this article. This was done in the presence of a committee appointed for the purpose of seeing whether the Commission did examine only the escutcheon, though that was asking more of even experts than Guenon claims to be able to do, or should be done.

Eastburn Reeder, member of the Board, and a practical dairyman of Bucks county, thus writes in relation to the system:

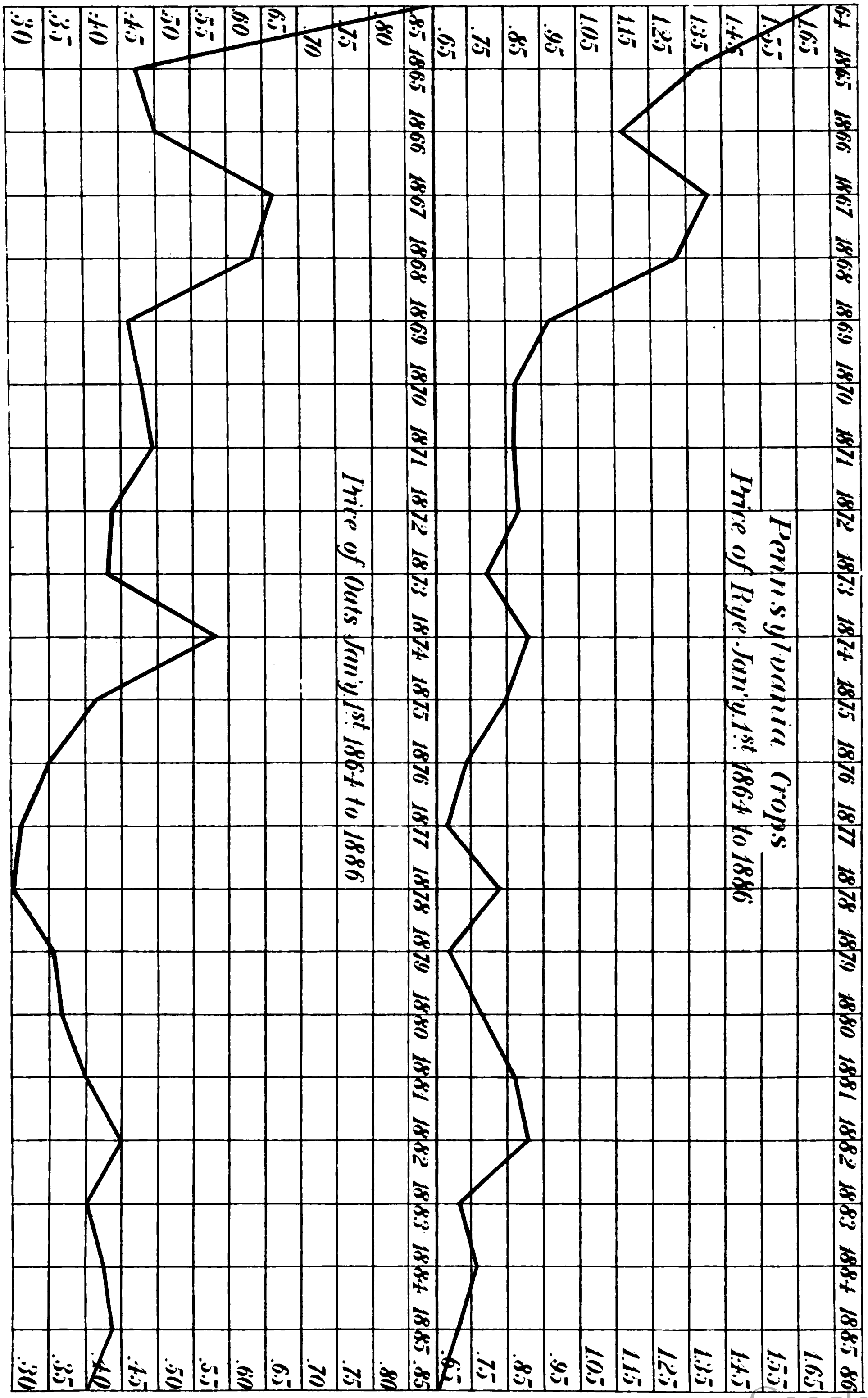
> My experience has been different. I have seen good cows with good escutcheons, and good cows with poor escutcheons; and I have seen poor cows with poor escutcheons, and good cows with poor escutcheons, in so many cases, that the system, I think, cannot be relied upon. The points which I would establish are these:
>
> 1. The escutcheon is a mark that can be bred in or out without improving or decreasing the value of the animal.
> 2. Guenon's system and classification furnishes no standard for correctly judging the cows of this country.
> 3. There is no valid reason that can be given why the system is true or correct.
> 4. The study of the physiology of milk secretions reveals the fact that the escutcheon of Guenon is neither cause nor effect.
> 5. Distinct and directly opposite tendencies or natures cannot exist in the same animal at the same time, and be recognizable by the same sign.
> 6. The marks of bastardy are contradictory in themselves, and tend only to mislead and confuse the examiner.
> 7. The system fails in so many instances that it cannot be safely depended upon.

Prof. Arnold, who is an accepted authority upon dairy matters, writes:

> But none of these indications, as laid down by the Guenon system, taken singly, is an infallible evidence of large yield; they must be considered together. A large escutcheon and milk veins, coupled with a small stomach, would be marked down at least one half of what might otherwise signify, and a large digestive apparatus, coupled with small milk veins and escutcheon, should be marked down in the same way.

During the test made by the State Commission in 1878, seven cows belonging to Thomas Gawthrop were carefully blanketed before the Commission were allowed to see them. We here append the report of the Commission in parallel columns with that of the owner, each having been given independent of the other:

THOMAS GAWTHROP'S ACCOUNT OF COWS EXAMINED AT THOMAS GAWTHORP'S FARM SEPTEMBER 20.	THE GUENON COMMISSION'S ACCOUNT OF COWS EXAMINED AT THOMAS GAWTHORP'S FARM SEPTEMBER 20.
No. 1. VICTORIA.—Grade, Jersey and Durham. Quantity, first. Quality, first. A first-class butter-cow, and milks well up to time.	No. 1. VICTORIA.—Grade, Jersey and Durham. Eight years. Quantity, first. Quality, first. Up to her time.
No. 2. CECIL.—Grade, Jersey. Quantity, first. First-class for butter. Milks up to time.	No. 2. CECIL.—Quantity, first. Quality, first. Up to her time.
No. 3. NELLIE.—Quantity, second. Quality, second. Dry from ten to twelve weeks.	No. 3. NELLIE.—Demijohn, 1. Quantity, second. Quality, first. Short eight weeks.
No. 4. LUCY.—Recently purchased. Yields three months from calving, thirteen quarts. Quality, first.	No. 4. LUCY.—Flanders, 2d. Quantity, second. Quality, first. Up to her time.
No. 5. LILY.—Grade, Jersey. Quantity, second. Quality, first. Milks up to time.	No. 5. LILY.—Grade, Jersey. Flanders, 2d. Quantity, second. Quality, first. Dry four to six weeks.
No. 8. STAR.—Grade, three-quarter Jersey. Yield, with first calf, from twelve to fourteen quarts per day, and milks well up to time. Quality, first-class.	No. 8. STAR.—Grade, three-quarter Jersey. Flanders, 3d. Quantity, second. Quality, first. Dry six weeks. Her Jersey blood helps to overcome some blemishes on her escutcheon.
No. 9. NORAH.—Quantity, first. Quality, first. Dry from eight to ten weeks.	No. 9. NORAH.—Grade, quantity, first. Quality, first. Up to her time.



Pennsylvania Crops

Price of Rye Jan'y 1st 1864 to 1886

Price of Oats Jan'y 1st 1864 to 1886

In conclusion, we may very properly adopt the following language as taken from the report of Mr. Hazard:

"Having given the result of their work, the Commission would now leave the further solution of the problem to the practical dairymen of the State. They, of course, expect that not only their report, but also the correctness of the system, will be criticised; but if this criticism is conducted with a spirit of fairness, and with a view to obtain the truth, they fully believe that the result will be favorable."

Potato Rot.

During the past autumn, and especially during the time at which the potato crop is usually stored in the cellar, our correspondents reported a number of serious cases of loss from "potato rot" Fortunately, these localities were circumscribed and limited, and the total loss was not nearly so great as was either feared or supposed. It was mainly confined to the southern and south-eastern portions of the State, but was also reported to a less extent in the northern tier of counties. Considered in the aggregate, the loss was not large, but in some of the infected localities destroyed the larger portion of the infected patches. Some of our official correspondents estimated the total loss at ten per cent. of the crop of the State, but our examination, made outside of the infected localities and free from over-estimate naturally due to such causes, convinces us that five per cent. of our total crop will fully cover the loss from this cause.

A summary of the results of our examination, and a careful condensation of the correspondence relating to the topic, enables us to draw the following conclusions:

First. That the form of the disease which is styled distinctively *the* potato rot, is different from that form which is found each year in every patch, and which only affects a single tuber, and which does not extend, even in the bin, from that tuber to others. That the latter in no case develops into the former or more destructive form.

Second. That the destructive form is due to the rapid multiplication of a minute parasitic fungoid growth, known to scientists as *Peronospo infestans*, which must in some way be kept alive, either in the tuber or in the soil, from year to year, and which never can originate in any locality or season.

Third. That the rapid development of this fungoid growth is increased or retarded by surrounding circumstances, and that the condition of the weather in relation to temperature and moisture has very much to do with the amount of injury done. That during moist or foggy and warm weather, the destructive element multiplies with great rapidity, and that its growth is retarded or stopped by cold weather.

Fourth. That the first place in which the fungoid growth can be detected is in or on the green leaves of the plant, which it will often, in a few days, affect very much as if a fire had run over the patch. At its first appearance this growth has the appearance of mould or light spots upon the most vigorous stalks and leaves; from these it extends to other portions of the plant, and finally to the tubers, with a rapidity which varies with the temperature and amount of moisture.

Fifth. That in a large majority of cases, if this growth is immediately removed with the tops, a large percentage of the crop may be saved. After starting on the leaves, it rapidly multiplies, and by rains is soon carried down the stalks and on to or into the tubers, and the injury is done beyond repair.

Sixth. That as this microscopic growth which causes the disease, cannot be originated or created, it follows that it must live over the winter or spring, either in the tuber or in the soil. As to which of these two is made the vehicle of carrying the disease over to the ensuing season, scientists differ. A majority, however, hold the theory that it exists at all times and in all soils, and like other parasitic growth, multiplies with great rapidity under favorable circumstances and surroundings. The initial plant may, and probably does, exist in the soil every year, but we only note its effects when its multiplication is so great as to attract attention by the loss which follows it.

Seventh. That this being the generally admitted theory, it is almost useless to expect that we can adopt any preventive measures for the destruction of the dangerous growth, at least before it shows itself on the plant. That all attempts to prevent it by certain advertised nostrums introduced into the soil with the cut tubers, will be futile, and result in a waste of money.

Eighth. That after the disease has manifested itself, the following precautions, if carried out, may save much loss: At once dig the tubers, and store them in shallow piles on an open and airy barn floor out of the sun and moisture. Sort them over repeatedly, carefully removing all diseased tubers each time; dust them occasionally with dry air-slacked lime; handle carefully and see that the piles are neither large nor high.

Ninth. After a season of this kind of decay, carefully, but *lightly*, dust all seed potatoes with air-slacked lime, so that, if possible, all the spores of the plant may be destroyed, and not planted with the cuttings, to produce or start the crop for the next season's destruction.

Tenth. To dig the crop and store it in a cool, airy place, as soon as the fall showers come on, during warm weather; get them out of the ground and out of the patch as soon as possible after the disease is manifested.

Prof. V. M. Spalding, of the State University of Michigan, thus describes the growth of this foe to the potato-grower:

> The destructive effects of the fungus are generally first observed upon the tubers late in the fall; but the disease is present much earlier in the season, and may be recognized on the tops by a certain characteristic blotched, black or brown spotted, dead appearance. A critical examination would show on the diseased tops numerous small white spots, which, when highly magnified, are found to be miniature forests of slender stems growing out of the surface of the leaves and stems of the vine. These tiny stems produce spores (called "summer spores") by millions, so small that a million could easily lie side by side on a square inch without crowding. When ripe, they separate from the stem and fall, and under the influence of water become exceedingly active, and push out a slender tube capable of becoming a mature plant inside the potato plant.
>
> The mature fungus lives in the tops or tubers of the potato, and is also microscopic. It consists of very numerous colorless, irregular branching, tube-like threads, which grow through the tissues of the potato, appropriating its juices, and so impoverishing the tissues that they either break down directly or are invaded by bacteria and other low forms which induce putrefactive decomposition. The mycelium or internal tube-like thread of this fungus is perennial and hardy, but the disease depends, primarily, for its spread the following season upon the preservation of this mycelium in the diseased tubers and tops.

Several of our correspondents allude to a prevailing belief that a small portion of lime or wood ashes deposited on and with the cutting will prevent the outbreak of the disease. If the initial growth of the fungoid plant is introduced with the cutting, we can readily see how this should produce the effect claimed for it, but if the spores of the disease are in the soil before the crop is planted, we fail to see how so local an application can have this effect. Rev. Marsena Stone, of the Leland University, at New Orleans, however, strongly advocates this plan, and writes in relation to it as follows:

> My garden was touched by four others that had a patch of potatoes adjacent to my own patch in each. They were all planted in the usual way, using no preventive. I went to a lime-kiln in the neighborhood, and procured the wood-ashes with which the lime was burned, and which was mixed with lime, probably nearly or quite half-and-half, and dropped a handful of the lime and ashes with my potato seed, and when the potatoes were fairly up, I dropped upon each hill a small handful while the dew was on, two or three times while they were growing. The other four patches had very few sound potatoes. They lost nearly all, and I had scarcely a rotten potato, no more than is usual in a healthy field. It is a very easy experiment to try. I have not since had occasion to try it in Ohio, and know nothing more of the efficacy of the means than this single fact. But since four other gardens lay against mine, and nothing but a fence between the patches and mine, I cannot doubt that the test is a valid one.

In relation to this claim, there exists the standing objection that it is not safe to base a general principle upon the result of one test. It is quite possible (accepting the scientific theory of the growth of the *peronospo infestans*) that it may possibly have existed in the plots of Mr. Stone's neighbors and not in his own, and that, by some fortunate combination of circumstances, the spores were not carried to his plants. We could give one or two very similar cases where no ashes were used with the cutting, but where the fence seemed to separate the diseased patch from one not afected at all.

Some of our correspondents claim that they can trace this trouble to the use of certain kinds of fertilizers, and that plots planted with superphosphate alone have been free, while adjoining plots planted with yard manure were almost entirely destroyed. This theory, also, needs a series of careful tests before we can accept it as correct. If, after a large number of experiments, it is found that phosphated plots are even, to a certain extent, exempt, it will be something gained, but so long as so many cases which disprove all such theories can be pointed out in every section of the State, we are compelled to receive all such assertions with a great degree of allowance.

Scientific Feeding.

Scientific research, assisted by chemical analyses and careful experiment at State and Government experiment stations, clearly prove that the present hap-hazard mode of feeding, as is usually practiced on the farm, is not economical, and that a carefully arranged system might be adopted, which, while it would still work up the coarse provender, would, at the same time, by the purchase of a small amount of concentrated food, enable the farmer to keep more stock and at a lessened cost per head. Rough fodder, meal, oil-cake, and bran are fed in a sort of hap-hazard way without any reference to their relative proportion, and in fact often without any thought or knowledge that there is any relative and proper proportion or ratio between the coarse and the concentrated food; without a knowledge of the fact that all of the former above a certain fixed amount is (except to the manure pile) lost to the feeder; that without a proper proportion of rough fodder (hay, straw, or corn fodder) a portion of the concentrated food (meal, bran, or oil-cake) is very often lost; that in the matter of feeding, science may assist the farmer, as it does in very many other operations of the farm; that by a proper proportion between the two classes of food *both* will yield a much better result.

Science and scientific feeding prove that each one of our foods may be divided into three distinct classes of elements, each having its own special part to play in the economy of feeding, and each dependent upon the other to a greater or less extent, depending upon the one selected for the comparison. To these three, chemists have assigned the names of albuminoids, carbo-hydrates, and fats (fatty matters). The albuminoids are so called from their chemical resemblance to albumen, and it is a remarkable fact that the chemical resemblance between animal and vegetable albumen, the gluten of wheat, the casein of milk and cheese, the legumen of peas and clover, and the fibrin of meat and wheat, is very close, and an analysis of the different samples shows but little more variation than two samples of the *same* substance selected from different sources.

The carbo-hydrates are so called because they are composed of carbon and the elements of water (oxygen and hydrogen). The principal carbo-hydrates are starch, woody fiber, gum, sugar, (grape, fruit, and cane,) and cellulose.

In familiar science, the albuminoids have been styled *flesh formers*, and the carbo-hydrates *heat makers*; the albuminoids going to increase the weight and secretions of the animal, and the carbo-hydrates supplying the material necessary to keep up the respiration and supply the heat of the body. Hence it follows that if an undue proportion of either is fed, the overplus (except in the manure pile) is lost. If we feed too much coarse fodder and too little of the concentrated food, the former is, to a certain extent, wasted, and the opposite is equally true.

In order to support life, even without an increase in weight, each of these two classes is absolutely necessary, but the best and most economical proportions will vary with the age of the animal, the season of the year, and the purpose for which it is kept and fed. By a large number of practical experiments, it has been found that one ratio or proportion is best for a fattening animal; that another is better for a milk cow kept for the production of butter, and still another (slightly varied) if she is kept for milk; a third for a working animal, and a fourth for a growing animal not working.

An animal fed upon food entirely destitute of carbo-hydrates will soon die, but if a portion of saw-dust is mixed with its food, life may be sustained almost indefinitely. If, on the other hand, the food contains no albuminoids, death will follow about as soon as if the animal had received no food of any kind. While the added material may be (theoretically) destitute of food value, yet its addition, by permitting the utilization of other portions, supports life; hence our assertion that an overplus of either is practically lost to the feeder.

The economy of the fatty matters in the food, while it is not so well understood as that of the other portions, is still of great importance in the work of fattening animals, and it scarcely needs argument or experimen to prove that foods which are rich in fatty material will best assist in increasing the richness of milk or the increase of fat in the fattening animal; such foods as are rich in fatty matters, as conmeal and oil-cake are, of course, valuable milk and fat producers.

It having been decided that a certain proportion of each of these classes is necessary to economical feeding, it becomes the duty of every feeder to endeavor to ascertain the best proportion for each kind of animal and for each purpose for which he feeds, remembering that an overplus of the carbo-hydrates will add only to the manure pile, without adding much to its value, and that an overplus of the more expensive albuminoids will make very expensive fertilizer.

For the purpose of ascertaining the best proportions for each special purpose, tests have been made at a number of our State experiments stations, and certain results, nearly uniform in all cases, have been reached. The German experiment stations, from their superior equipments, have greatly assisted in the work, and the results in this country have very nearly corresponded with those of foreign stations. All of what we really *know* in relation to scientific feeding is due to results obtained at these stations, for the great expense which necessarily attends such scientific tests necessarily prevents practical feeders from duplicating them with any degree of exactness.

At these stations it has been proven that the most economical ration is one which contains two and one half pounds of albuminoids, twelve of carbo-hydrates, and a half pound of fatty material, in other words the albuminoids should be to the carbo-hydrates as one to five and one half; it then follows that any ration which very nearly (in its natural condition) contains these proportions, is the proper one for the production of milk.

For milk cows the German feeding standard must contain twenty-four pounds of dry substance of which two and one half shall be albuminoids, and twelve and one half carbo-hydrates, less than one half pound being fatty material. The best meadow hay (taken as a standard or starting point) is found to contain in every twenty-three and two tenths pounds of dry material, two and forty-nine hundreds of albuminoids, and twelve and seventy-five hundreds of carbo-hydrates, thus proving that the dry grass, as provided by nature, is the unit of comparison, and that nature makes no errors in feeding materials.

With this data as a starting point, Elliott W. Stewart, in his standard work on "Feeding Animals," gives the following as economical rations. The reader who is curious in such matters will find a large number of other rations given him in this work, which will well repay a careful and critical examination. Mr. Stewart finds the following to very nearly approach the standard ration in their relative proportions of albuminoids and carbo-hydrates:

1.
16 pounds meadow hay.
8 pounds wheat bran.
2 pounds linseed meal.
6 pounds cornmeal.

3.
10 pounds clover hay.
10 pounds straw.
4 pounds linseed cake.
4 pounds wheat bran.
2 pounds cotton-seed meal.
4 pounds corn-meal.

5.
10 pounds corn fodder.
10 pounds oat straw.
2 pounds linseed meal.
4 pounds malt sprouts.
10 pounds corn and oat meal.

7.
60 pounds of clover ensilage.
4 pounds corn-meal.

2.
18 pounds corn fodder.
8 pounds wheat bran.
4 pounds cotton seed-meal.
4 pounds corn meal.

4.
15 pounds of straw.
5 pounds of hay.
4 pounds cotton-seed meal.
4 pounds bran.
4 pounds corn-meal.
3 pounds malt sprouts.

6.
60 pounds corn ensilage.
5 pounds hay.
2 pounds linseed meal.
4 pounds bran,

8.
40 pounds of corn ensilage.
40 pounds clover ensilage.
4 pounds of bran.

It is claimed that (scientifically and chemically, as well as practically,) these rations very nearly correspond with the best hay, not only in the sum total of feeding power, but also in the relative proportions of albuminoids and carbo-hydrates. Comparing Nos. 1 and 2, we find that in No. 2 the increase of albuminous compounds has permitted the substitution of corn fodder for hay. Comparing Nos. 3 and 4, we find that the increase in the amount of cotton-seed meal has permitted a decrease in the amount of hay, and a corresponding increase in the amount of straw. Comparing Nos. 5 and 6, we note that the corn fodder has been replaced by six times its weight of corn ensilage.

At the New York experiment station, Dr. E. L. Sturtevant has arrived at the following results in relation to ensilage as compared with other food material: "When the ration was eighteen pounds of an even mixture of meal and bran, together with about seventy pounds of ensilage daily, and this compared with the same amount of grain, with thirty pounds of the same dried fodder, which, put into the silo, formed the ensilage, and the same amount of grain with twenty pounds of hay, the following conclusions were justified by our results, viz: That twenty-six pounds of fodder corn was equivalent to seventy pounds of ensilage or eighteen pounds of hay. Expressing these results in tabular form, using one hundred pounds as the unit for comparison, we have—

"One hundred pounds of ensilage was the equivalent of thirty-eight pounds of fodder corn.

"One hundred pounds of ensilage was the equivalent of twenty-six pounds of hay.

"One hundred pounds of fodder corn was the equivalent of two hundred and sixty-two pounds of ensilage.

"One hundred pounds of fodder corn was the equivalent of sixty-nine pounds of hay.

"One hundred pounds of hay was the equivalent of three hundred and eighty-one pounds of ensilage.

"One hundred pounds of hay was the equivalent of one hundred and forty-five pounds of fodder corn."

Prof. Horsfal, a celebrated English feeder, gives the following as his favorite *milk* ration: Five pounds of rape cake and two pounds of wheat bran, mixed with sufficient bean straw, oat straw, and shells of oats, in equal proportions, to supply them three times a day with all they will eat." The same authority states that "albuminous matter is the most economical in the food of the milk cow, and any deficiency in the supply of this will be attended with loss of condition, and a consequent deterioration in the quality of the milk."

In response to the inquiry of a correspondent of the *Country Gentleman*, Mr. Stewart criticises a ration composed of forty pounds of ensilage, six of the best clover hay, six of cornmeal, and six of middlings: "This ration (he writes) has a nutritive ratio of 1 to 1.9; here the albuminoids are deficient. And two pounds of decorticated cotton-seed meal or two of new process linseed meal would make it an excellent ration. It will be seen that if the clover-hay were increased to ten pounds, it would much improve the ration; if instead of increasing the clover hay, four pounds of bran were added, it would balance the ration fairly."

In his work on "Feeding Animals," (page 297,) Mr. Stewart gives the following ration, which we publish entire in order to show how the value is calculated and shown:

	Dry organic substance.	DIGESTIBLE.		
		Albuminoids.	Carbo-hydrates.	Fats.
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*
Twenty pounds best clover-hay,	15.20	2.14	7.52	0.42
Five pounds straw or corn-stalks,	4.10	0.04	1.82	0.02
Fourteen pounds cornmeal,	11.77	1.17	8.48	0.50
Total ration,	31.07	3.35	17.82	0.96
German standard ration,	31.20	3.60	17.70	0.82

At the German experiment stations, where much care and expense has been divested to the purpose of ascertaining the very best and most economical rations for each special purpose, and Professor S. W. Johnson has made a condensation of tabular results thus reached, from which we take the following table as illustrating scientific feeding carried on to its utmost extent; in the table it will be noted that in addition to giving an economic ration for working animals, it divides the period of fattening into three parts, each of which, has its own standard ration; it will also be noted that the amounts named are the per diem food per thousand pounds of animal live weight:

	Total organic dry substance.	NUTRITIVE DIGESTIBLE SUBSTANCES.			Total nutritive substance.	Nutritive ratio.
		Albuminoids.	Carbo-hydrates.	Fat.		
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
Oxen at rest,	17.5	0.7	8.0	0.15	8.85	1 : 12
Oxen moderately worked,	24.0	1.6	11.3	0.30	13.20	1 : 7.5
Oxen hard worked,	26.0	2.4	13.2	0.50	16.10	1 : 6.0
Oxen fattening, (first period,)	27.0	2.5	15.0	0.50	18.00	1 : 6.5
Oxen fattening, (second period,)	26.0	3.0	14.8	0.70	18.50	1 : 5.5
Oxen fattening, (third period,)	25.0	2.7	14.8	0.60	18.10	1 : 6.0
Cows in milk,	24.0	2.5	12.5	0.40	15.40	1 : 5.4

AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS IN THE UNITED STATES.

In order to promote the interests of agriculture and the mechanic arts, Congress, in 1861, by a special act, gave to each State 30,000 acres of the national land for each of its representatives in Congress. The fund arising from the sale of this land was to remain a perpetual endowment, which the States were bound to replace, if lost, for the establishment and maintenance of colleges for the benefit of agriculture and the mechanic arts. In 1882, the value of colleges and experimental farms, supported totally or in part by the proceeds of this act, was given at $6,531,844 00; 9,600,000 acres were given to the States, and an aggregate of $9,000,000 was obtained by the sale of the lands. In addition to this, a number of the States have still large areas not yet disposed of.

The large number of inquiries which have reached the office of the Board relating to these colleges and experiment stations, is our excuse for offering the following condensed account of the present condition of each:

Alabama.

The Agricultural and Mechanical College of Alabama is situated at Auburn, and occupies 100 acres. Cost of main building, $65,000; total value of grounds, building, and apparatus, $100,000; income from the endowment fund of the National Government, $253,000; total revenue, $22,500.

An experimental farm of 20 acres is devoted to a series of experiments with fertilizers, crops, and fruits. The course of study covers four years, and scientific and practical agriculture is included in the list of studies.

Arkansas.

The Industrial University of Arkansas is situated at Fayetteville. Buildings, grounds, &c., are valued at $170,000; endowment from National land-grant fund, $130,000; annual income from endowment fund, $10,400; total annual expenses, $17,500; salaries, $15,500.

There is an experimental farm in connection with the college.

California.

The University of California is located at Berkley. The grounds and buildings are valued at $1,000,000; endowment from the National land-grant fund, $566,280, with lands to the value of $26,860 yet unsold; annual income from land-grant fund, $39,226. The latter fund is mainly devoted to agriculture and mechanic arts, and the teaching in these branches is assisted by an experimental station on which experiments with fertilizers, grains, forage plants, and field crops are carefully conducted. Large orchards of fruits adapted to the climate are attached to the farm, large numbers of forest and fruit trees have been introduced from Europe, and much has been done for the cause of horticulture and forestry. The total endowment fund (from all sources) is $1,678,386.

Colorado.

The State Agricultural College of Colorado is located at Fort Collins. It has received from the National land-grant fund 90,000 acres of land, which are yet unsold. The college is supported by a special tax of one fifth of a mill on the State valuation. Its income from this source is about $20,000. A farm of 280 acres is attached to the college, and is mainly used for experimental purposes. The lands, buildings, &c., are valued at $50,000.

Connecticut.

The fund derived from the National land grant to this State was alloted to the Sheffield scientific school, connected with Yale college, and the endowment fund from this source amounts to $135,000. The buildings are in New Haven, and, with the grounds, are valued at $200,000. This State was the first in the Union to establish a State experimental station or farm, and at present has one of the most efficient. It contains seven acres, which, with the buildings, is valued at $12,000. To this must be added the chemical laboratory and apparatus to the amount of $7,500.

Delaware.

The income of the land-grant endowment fund of this State is given to the Delaware college at Newark. The fund amounts to $83,000; the lands, buildings, &c., are valued at $75,000; the total income of the college is $5,500. There is no experimental farm in connection with the college. The agricultural education of the pupils is confined to lectures and analyses of soils and fertilizers.

Georgia.

The Georgia State College of Agriculture and Arts (a branch of the State University) is located at Athens. Its endowment fund, from the sale of National lands, amounts to $242,202, from which the institution receives an annual income of $17,000. Of this, $2,000 goes to each of the following institutions: North Georgia Agricultural College, at Dahlonega; Middle Georgia Military and Agricultural College, at Milledgeville; South-West Georgia Agricultural College, at Cuthbert; and the South Georgia Agricultural College, at Thomasville. Of the fund, the central institution retains $8,000. The buildings, lands, &c., are valued at $50,000. There is an experimental farm connected with the University, on which extensive experiments relating to the effects of special manures upon the production of cotton have been tried and reported upon.

Illinois.

The University of Illinois, at Urbana, receives the income from the National land-grant fund. This fund amounts to $337,000, and the buildings, lands, &c., are valued at $400,000. The State has appropriated $127,000 for the erection of the buildings. The land occupied by all of the departments amounts to 623 acres. In connection with the Agricultural Department proper, there are two forms containing respectively 410 and 180 acres, on which practical experiments in agriculture and stock-breeding are carried on. A large herd of improved animals is kept on the "stock farm" of 180 acres. Experiments in field and orchard culture are carried on, and full reports annually made. A large forest plantation, for experimental purposes, is also carefully maintained. The botanical and entomological work performed is of the very best in the country.

Indiana.

The income from the share of this State in the National land-grant fund was given to the Purdue University, at Lafayette. The total endowment fund from the land grant is $345,000. The State has appropriated $168,000 within the past twelve years. The county has donated $50,000, and from a private bequest, the university has received $150,000. Total estimated value of land, buildings, &c., $300,000; total number of acres belonging to the institution, 160, valued at $50,000. The land-grant fund gives an annual revenue of $18,280. The total endowment income is $22,235. The expenses are about $36,132. Salaries amount to $18,000 annually. The revenue of the experimental farm covers its expenses.

Iowa.

The Iowa State Agricultural College, at Ames, receives the income of the Iowa land-grant fund. This fund amounts to $637,800. The lands, buildings, &c., are valued at $1,000,000. The farm contains about 700 acres, of which 300 are in woodland and natural pasture, 40 in orchards, and 80 devoted to ornamental planting, &c. Practical field experiments are regularly and systematically carried on. Experiments in stock-breeding are tried. Horticulture is cared for by the planting of untried varieties of fruit; and entomology and veterinary science receive a fair share of attention. The total revenue is about $48,000, which barely meets the annual expenses.

Kansas.

The State Agricultural College of Kansas is located at Manhattan. The endowment fund from the land grant amounts to $500,000. The value of land and buildings, &c., is $161,000. The farm contains 364 acres, of which 105 recently were purchased for $125 per acre; average number of pupils, 350, of which 110 are females. The chemical laboratory is fitted for tne work of eighty students, and the appliances are of an excellent character. Field experiments with fertilizers, crops, stock, forest-planting, &c., are carefully conducted and an annual report made. The annual revenue of the institution is $35,000. Of this, $21,550 is expended for salaries. A conservatory has been built at a cost of $3,000.

Kentucky.

The Agricultural and Mechanical College of Kentucky, at Lexington, receives the benefit of the land-grant endowment fund, which amounts to $165,000. The lands, consisting of 52 acres, were donated by the city of Lexington. Lands are valued at $25,000 and buildings at $85,000, or a total of $110,000. The income from the land-grant fund is $9,000, to which is added a special tax of one half cent upon each $100 of taxable property in the State, making $16,000, and tuition fees, amounting to $25,000; total, $28,400. Expenses are kept within this amount.

Louisiana.

In this State, the State University formed a combination with the

State Agricultural and Mechanical College, and under the title of the State University and Agricultural and Mechanical College receives the income of the endowment fund resulting from the sale of National lands. These combined endowments amount to $318,000; buildings, grounds, &c., are valued at $350,000. The annual revenue from the fund is $14,500, to which the State adds an annual appropriation of $10,000, making a total of $24,500. The students devote a fixed time each day to field and practical labor on the farm. A stable for the production of vaccine matter has been established, and produced a handsome revenue.

Maine.

The State College of Agriculture and the Mechanic Arts, at Orono, occupies 376 acres of land, and receives the benefit of the land-grant endowment. Interest on the endowment fund, $8,000 per year; $7,000 annually appropriated by the State; and tuition fees, amounting to $2,000, give the institution an income of $17,000 per annum. Horticulture, entomology, and kindred topics receive due attention. An experimental station receives a separate allowance of $5,000 per year, and mainly devotes its attention to analytical work.

Maryland.

The Maryland Agricultural College is at College Station. The farm contains 286 acres. Its endowment fund amounts to $112,500, and the buildings, grounds, &c., are valued at $100,000. The revenue from the endowment fund is $7,000; to this is added an annual appropriation of $6,000, and board and fees amounting to $12,000, a total of $25,000; of this, $8,500 is paid out for salaries.

Massachusetts.

The Massachusetts Agricultural College and Experiment Station is situated at Amherst. There are 382 acres connected with the institution. The endowment fund from the sale of National lands amounts to $246,314, and this by the State has been increased to a permanent fund of $360,067. Estimated value of land, buildings, &c., $205,771. A large dairy is maintained on the farm. Field experiments form a regular portion of the agricultural training of the pupils. The horticultural department occupies 45 acres. A conservatory and greenhouse has been erected at a cost of $12,000. The experimental station proper occupies 10 acres, is an entirely separate institution, and is supported by a special grant of $10,000 annually from the State. The revenue from the endowment fund amounts to $13,000, tuition fees and other sources of income, $12,000, making a total of about $25,000.

Michigan.

The Michigan Agricultural College, at Lansing, occupies a farm of 675 acres; the land is valued at $75 per acre; the land, buildings, &c., at $338,471; the endowment fund from the sale of National lands amounts to $339,000, with a large amount yet unsold; a large herd of improved stock is kept on the college farm; 80 acres are devoted to horticulture; a green-house, costing $9,500, has been erected; a fine botanic garden has been established, and the apiary department of the college, under the charge of Professor Cook, is achieving a National reputation. The revenue from the endowment fund amounts to $23,734, and is assisted by State appropriations. The annual expenses amount to $29,000, of which $21,000 is for salaries.

Minnesota.

In this State, the University at Minneapolis was granted the income of the land endowment fund, upon the condition that a department of agriculture and mechanic arts should be added to its already existing educational features. A permanent endowment of the university now amounts (with that of the land-grant fund) to $575,000; this yields an annual income of $35,000, to which the State annually adds appropriations amounting to $23,000, making a total income of $58,000. The university owns and controls an experimental farm of 155 acres, which is devoted to testing new grains, fruits, and fertilizers. The lands, buildings, &c., are valued at $220,000.

Mississippi.

The income from the land-grant fund of this State has been equally divided between the white and colored races; the portion of the white citizens is under the control of the Agricultural and Mechanical College of Mississippi, located at Starkville; the college farm embraces 1,750 acres, of which 600 are under cultivation and 200 in woodland; its endowment fund amounts to $113,575, and the land and buildings are valued at $203,400; there are special departments for stock, dairy, and field experiments, and regular annual reports are prepared for distribution; the income from the endowment fund is $5,678, which is increased by State appropriations of variable amounts; 100 acres are devoted to horticultural interests, and systematically planted with fruit trees.

The portion of the fund designed for the use of the colored inhabitants of the State is under the control of a college at Vicksburg; its endowment fund amounts to $113,575, and its land, buildings, &c., are valued at $43,000; its annual revenue is about $6,000; this college averages 170 students, and is productive of great good to the class for which it is designed.

Missouri.

The agricultural and mechanical interests of Missouri are placed under the care of the Agricultural and Mechanical College at Columbia; its endowment fund amounts to $219,000, and the value of its buildings, &c., to $150,000; it has 640 acres of land under its control, and a certain amount of farm labor is obligatory upon the students; the experimental station in connection with the college has published the result of numerous experiments, which have attracted much attention in the agricultural world; the income from the permanent fund is $11,000, which is assisted by annual appropriations from the State; the students taking the agricultural course number 21.

Nebraska.

The University of Nebraska has established a branch which is known as the Agricultural College of Nebraska; it is located at Lincoln, and controls a farm of 320 acres, upon which all kinds of improved stock are kept for exhibition and breeding purposes; the agricultural land scrip of this State being yet unsold, the college is supported by a direct appropriation from the State treasury.

New Hampshire.

Dartmouth College, at Hanover, has established a branch institution which is called the New Hampshire College of Agriculture and Mechanic Arts; its endowment fund amounts to $100,000, and its buildings, &c., are valued at the same amount; the college farm contains 360 acres, and maintains a large herd of improved cattle, sheep, and swine; experiments in crops, fertilizers, &c., are carried on; the income from the endowment fund is $6,000, from State appropriations $3,000, and the current expenses absorb all incomes; the number of students taking the agricultural course is small.

New Jersey.

By taking the title of the State College of Agriculture and Mechanic Arts, Rutger's Scientific School, at New Brunswick, obtained the income of the land-grant fund; the 210,000 acres of public land which was allotted to this State was sold for $116,000, and produces an income of $6,960 per year; the farm of 98 acres, with its buildings and necessary equipments, cost $93,000. A special appropriation of $80,000 per year is made for the support of the experiment station; the work of this station is mainly confined to the analyses of fertilizers and soils.

New York.

Cornell University, at Ithaca, by establishing the New York College of Agriculture and Mechanic Arts, obtained the control of the land-grant fund of the State; the endowment fund from lands sold amounts to $473,412, and the institution has a large proportion of its allotment yet unsold; the total income of the university is $130,000, and its expenditures for salaries is $85,000; the farm embraces 120 acres, on which the students work three hours each day. This institution probably offers the best inducements to agricultural students, and yet out of an average attendance of over 400, but 22 take the agricultural course.

The State Experimental Station is located at Geneva, and was incorporated by an act of the Legislature in 1881. The experimental farm of 125 acres was purchased at a cost of $25,000, and all expenses are paid by a special appropriation of $20,000 per year from the State treasury. The field experiments, as well as those in the nursery and green-house, under the care of Dr. E. L. Sturtevant, promise to be of great assistance to the farmers of New York and other States. A complete chemical laboratory and museum are attached to the station.

North Carolina.

The lands appropriated to this State were placed under the control of the State University, at Chapel Hill; they produce a permanent endowment fund of $125,000, which gives a revenue of $7,500 per year; when the State appropriations are added to this, the total annual income is $19,000, of which $16,000 is expended for salaries. There is no farm connected with the institution.

The State Experimental Station, at Raleigh, is under the management and control of the State Agricultural Department, and its work is mainly confined to analyzing soils and fertilizers. Accurate test of the growing qualities of seeds have also been made at the station.

Ohio.

The State University of Ohio, at Columbus, receives the income of the endowment fund of the State; the fund amounts to $538,000.

Franklin county gave $300,000, and the city of Columbus $28,000. The income from the permanent fund is $32,270, and with the State appropriation and tuition fees, swells the annual income to $52,000; of this $27,000 is paid for salaries. Of an average of 300, but 35 students take the agricultural course. The farm consists of 340 acres, costing, with buildings and equipment, $600,000 in all; a fine herd of Jerseys is kept on the farm, and is somewhat remarkable for having yielded a net profit of $16, to which should be added $246 for calves sold.

The Ohio State Experimental Station is, to a certain extent, under the control of the University, and of its income of $11,000, receives $5,000 per annum from the University, and the balance by direct appropriation from the State treasury. Extensive experiments with grains, fruits, and vegetables have been made, and the results published.

Oregon.

The land grant was given to Corvillis College, at Corvillis. The funds thus accumulated amount to $50,000, and the annual income to $6,000, which is expended in salaries. There is no experimental farm connected with the college.

Pennsylvania.

The permanent fund of this State, derived from the National land grant and supplemented by State appropriation, amounts to $500,000, the interest of which is assigned to the Pennsylvania State College, near Bellefonte. The estimated value of the lands and buildings belonging to the college is $451,600. The building is a large structure, 240 feet long by 80 wide, and five stories in height. In addition to the college farm, the institution has three experimental farms; one at the college, one at Indiana, and the third at West Grove. A special course in agriculture and mechanic arts is provided. Practical instruction is afforded in both branches by the farms and work-shops at the college. Extensive field experiments are conducted under the care of the professor of agriculture, who also has charge of the experimental farms. Experiments in the various departments of horticulture are also conducted under the care of an appropriate professor. A special course of lectures for the benefit of farmers is given each year, for which no charge is made. An orchard, embracing all the better varieties of fruits, is under the control of the proper department. It is to be regretted that, with all of its many and excellent provisions for an agricultural or mechanical course, this institution does not receive the patronage which it deserves.

Rhode Island.

The endowment fund of this State amounts to $50,000, and is under the control of the Brown University, at Providence. The agricultural instruction is confined to lectures, and no farm is connected with the institution.

South Carolina.

The land-grant endowment of this State amounts to $191,800, which is invested in State bonds. The income is divided equally between the South Carolina College of Agriculture at Columbia, (for whites,) and the Claflin College at Orangeburg (for colored.) The institution at Orangeburg, has connected with it a farm of 116 acres, which, with its buildings, &c., is valued at $10,000. It is mainly devoted to the education of colored children.

Tennessee.

The University of Tennessee, at Knoxville, receives the fund resulting from the sale of the public lands. The endowment of the university amounts to $405,000. The income is $24,100 annually. The annual expenses are about $20,000, and the buildings, &c., are valued at $134,700. Lectures are given on agricultural topics, and a farm of 200 acres is connected with the university. An orchard of 300 trees affords instruction in horticulture.

Texas.

The State Agricultural and Mechanical College at College Station, receives the income of the land-grant fund, which amounts to $204,000, and yields an income of $14,280; the buildings are valued at $260,000; a farm connected with the college affords practical instruction in agriculture and the basis for many experiments of a practical nature.

Vermont.

The State Agricultural College gand University, at Burlington, receives the benefit of the appropriation of the National Government; the fund amounts to $135,500, and with other endowments, gives the college an annual revenue of $22,000; a course of lectures on agricultural topics is given each session.

Virginia.

The endowment from the National grant which was due to Virginia amounts to $285,000, and of its income, two thirds are appropriated for the use of the Virginia Agricultural and Mechanical College at Blacksburg, and the remainder to the Hampton Normal and Agricultural Institute; the College at Blacksburg has the control of a farm of three hundred acres, upon which experiments in agriculture and horticulture are conducted; the buildings, &c., are valued at $100,000, and its income amounts to $20,000 annually; the institute at Hampton is for the education and advancement of the colored race, and is mainly supported by voluntary contributions; from contributions, it receives $30,000 annually; from the endowment fund, $10,000, and from other sources $5,000; total, $45,000; the lands, buildings, &c., are valued at $420,364; there is a regular agricultural course in connection with the institution, and a large nursery and orchard, well stocked with trees and plants, furnishes a branch of the horticultural education.

West Virginia.

The land granted to West Virginia by the National Government furnishes a permanent fund of $110,000, which is placed under the control of the West Virginia University, at Morgantown; its buildings and grounds are estimated to be worth $175,000, and the permanent income from the fund is $6,500, to which the State adds $16,000.

Wisconsin.

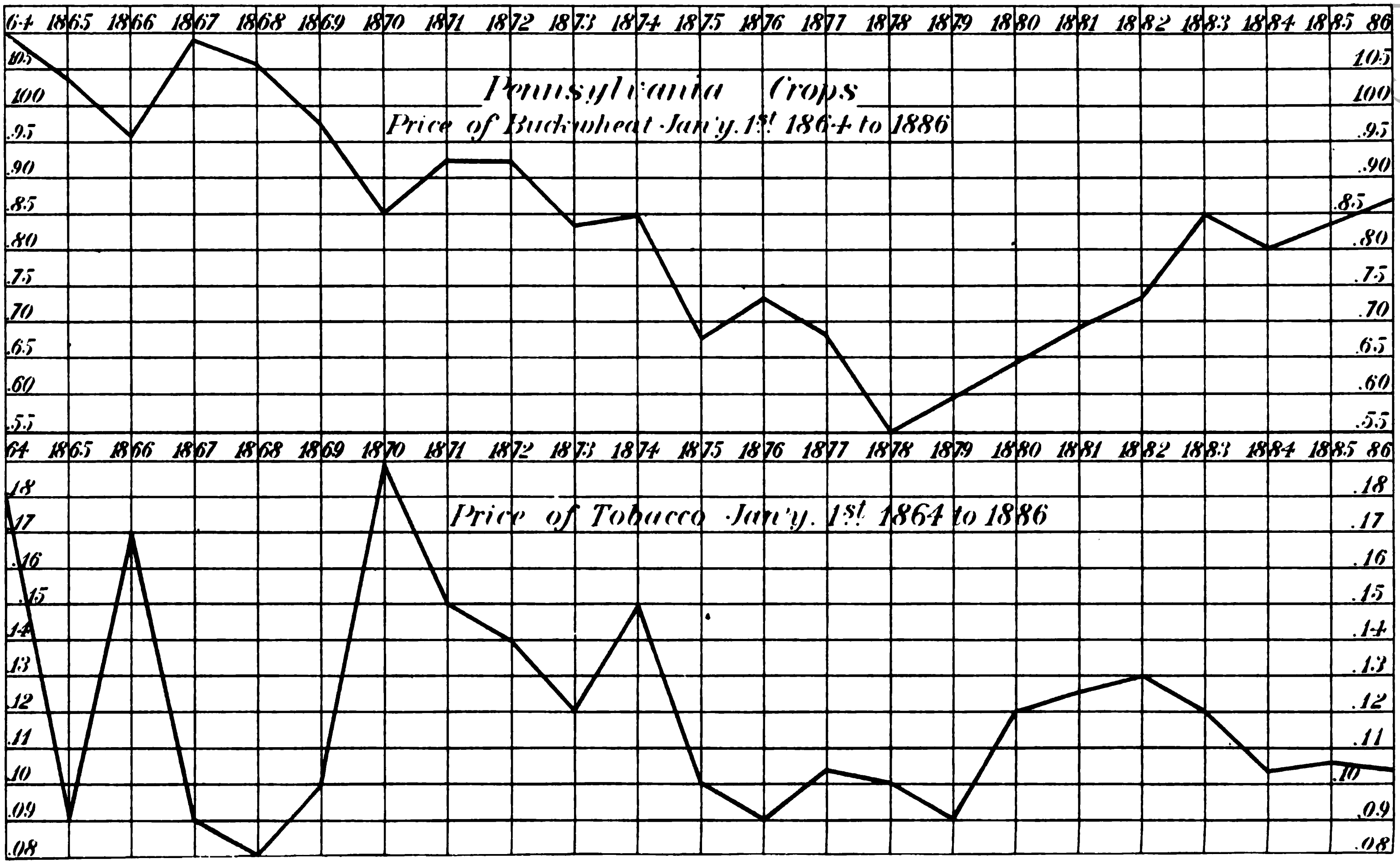
As a portion of the University of Wisconsin, the State Agricultural College of Wisconsin controls the land-grant fund; the fund amounts to $267,330, and with other funds, gives the College a permanent one of $497,990; the value of buildings, grounds, apparatus, &c., is placed at $455,000; the total income of the University is $83,000; the farm in connection with the college contains two hundred acres, and supports a fine herd of improved stock; a complete chemical labratory, is a portion of the equipment of that institution.

INVESTIGATION OF DISEASES IN LIVE STOCK.

Each year during its existence, the Board has devoted more or less of its contingent funds to the investigation of diseases of live stock, the nature and cure of which are not well understood by the farmer and often not by local veterinary surgeons. So efficient had this branch of the work of the Board become that in 1879 the Legislature made a special appropriation of two hundred dollars for this purpose. The next year this was increased to two hundred and fifty dollars and was still far short of the amount which could have been economically and acceptably used. Each year the fund has been conscientiously devoted to the purpose for which it was appropriated, and the farmers of the State have learned to look upon the officers of the Board as the proper ones to whom to make an appeal when the character of any special disease was beyond their knowledge or that of the local veterinary surgeons. In no case, has more than a single visit been paid to the same herd, and in no case has the stock been treated for the owner at the expense of the state or to the detriment of the local practitioners. In no case when there were available funds, have the Secretary and surgeon of the Board failed to respond to calls of a proper nature. In some cases when the disease was manifestly one which should be well understood and treated by the local surgeon, advice has been sent by mail and the expense of a visit avoided. In other cases when the funds were exhausted, we have been compelled to refuse to respond to such calls, and in some cases this refusal has been misunderstood. That the amount thus appropriated has benefited the farmers of our State more that any like amount appropriated in other directions is beyond a doubt, and, as is readily proven by the results, double the amount could be as legitimately and profitably expended in the same direction.

While the work of suppressing contagious pleuro-pneumonia has in some measure taken away a portion of this work, yet there was probably never a year since the organization of our Board during which there was a greater demand for the services of our veterinary surgeon. Each year has, it is true brought with it more or less of this kind of duty and always much more than the limited appropriation would satisfy, but the past season has exceeded all others in this respect.

The class of diseases which we have been called upon to investigate is such as are mainly due to errors in water-supply, pasture, or supply of shelter and shade. The past summer and autumn, especially during August and the early portion of September, has been noted for hot and long-continued dry weather, scanty water-supplies either dried up entirely or became so diminished in volume as to become warm, and in many cases offensive; all standing water was more or less poisoned by minute vegetable growth, and under the surroundings



Pennsylvania Crops

Price of Buckwheat Jan'y. 1st 1864 to 1886

Price of Tobacco Jan'y. 1st 1864 to 1886

all disease germs were increased with great rapidity. The accumulation of this poisonous material, coupled with the decrease in the amount of water, caused the animals to take the poison into their systems in much larger amounts than during previous years, and disease was the inevitable result. As might have been expected, anthrax disorders have been prevalent, as have been outbreaks of splenic apoplexy and kindred diseases. In all cases, however, these outbreaks have yielded to the treatment recommended by our surgeon.

The diseases which have absorbed the greater portion of the fund were tuberculosis, Texan or splenic fever, splenic apoplexy, anthrax fevers, husk or hoose in young stock, and ropy milk in the dairy districts.

In addition to these diseases which we have thus specifically named, we have investigated others in the counties of Berks, Erie, Chester, Delaware, Lancaster, York, Cumberland, Dauphin, Lehigh, Susquehanna, Bradford, Bucks, Philadelphia, Northampton, and Adams. In sundry cases, the investigation has been made through the local veterinary surgeon, without the necessity of a visit from the Secretary of the Board or its surgeon. In all cases in which its nature does not make an immediate examination imperative, this latter mode of examination has been adopted, and thus our limited fund has been extended and assistance afforded at little expense to the State.

Southern, Texan, or Splenic Fever.

As usual, we have to report several cases of infection from Texan or splenic fever, and to report more than our average annual loss from this cause. So far as known, no Texan or southern infected cattle have been brought into the State, and all cases examined were caused by contact with the cars in which other cattle had been moved or with the excretia of diseased Southern animals.

It is a fortunate thing for the Pennsylvania stock-raiser and feeder that the laws which govern this disease are entirely different from those which govern all other contagious diseases of the human or bovine race. If it was subject to the same rules as govern contagious pleuropneumonia, our annual losses would reach a figure which would arouse all to the importance of some official attention to limit its spread and prevent loss. So far as our investigations can be accepted as a guide, we have not had any cases of the Texans having passed over our borders. All cases reported and investigated have been those in which the northern or "native" cattle have come in contact with the Texans, or with the infection, at points outside the State, and, with the disease in their veins, have been brought into the State. It is fortunate that at this point Texan fever varies from all known rules governing other contagious diseases, and that these infected "native" or northern animals cannot infect others. Were it otherwise, its spread would be rapid and the loss great. It is also fortunate that a good frost will not only prevent further infection, even direct from the southern cattle, but will also prevent its further increase or spread in the diseased animals. In all cases, we expect the diseased animals to recover rapidly after the first heavy frost or period of cold weather.

There is, however, one point in connection with this disease to the importance of which the attention of our stock-raisers cannot be too urgently directed. That is, that while there is every season a point of latitude (now in central Virginia) at which the disease is effectually destroyed by cold weather, yet it is well known that this line of demarcation is each year reaching further and further north, and that the point at which the disease may be said to be "acclimated," and at which it becomes permanent, is gradually pushing further north each season, and it may, perhaps, be well to accept it as a possibility that, if unchecked, this point may approach so near to us as to be a continual menace to the Pennsylvania stock-feeder. The insidious nature of the disease renders it very difficult to combat its spread; for, while the southern animal may have the power of infecting any native or northern animals with which it may come in contact, yet it will show no outward sign of the disease.

In all outbreaks of this disease, the Board has no power for action beyond sending its surgeon with power to give such advice as may be needed, and this must be confined to one visit, as the funds under our control compel the most rigid economy upon our part.

Tuberculosis.

As in former years, we have again to report the gradual but steady increase of tuberculosis, or tubercular consumption, among the dairies of the State. The visits paid in search of contagious pleuro-pneumonia, in addition to those of more direct investigation, clearly prove that this disease exists to an extent unsuspected even by the owners of the infected herds, and that the losses from it considerably exceed those from contagious pleuro-pneumonia. In one locality in Lancaster county, a whole neighborhood may be said to be infected, and a number of farms in close proximity are subject to losses from this cause. In some cases the owners, acting upon the advice of the surgeon of the Board, have voluntarily killed the diseased animal to save the lives of the remainder of the herd; but the cases in which such animals have been put into the market are much more numerous. This is, in some cases, done innocently, but in others the existence and character of the disease are well known to the owner. We can, perhaps, best convey our opinion of the daugerous character of this disease by the statement that, if the choice of having either contagious pleuro-pneumonia or tuberculosis in our dairy was afforded us, we would be at a loss to make the selection; but, with our present knowledge of both, would probably prefer contagious pleuro-pneumonia, from the fact that, while its attacks are more rapid, we have the assurance of sooner getting free from it, while, with tuberculosis, the disease runs its course so slowly, and in such an insidious manner, as to almost defy all efforts to check it by any means short of the destruction of the entire herd. To the danger of tuberculosis, we also have to add the undoubted fact that it is also propagated by hereditary taint, and descends from the parent to the calf, and that this mode of propagation is quite as dangerous on the side of the male as on that of the female.

By some it is claimed that it has been, and repeatedly is, conveyed from the animal to the human race by the milk and flesh of the diseased animals. While we are not in a position to controvert this theory, yet there is no doubt that after the disease has reached a certain point this is true, but, at the same time, it is difficult to imagine a nature so depraved as to permit of the use of either the flesh or milk of an animal with the disease so far advanced as would be necessary to thus spread itself.

Splenic Apoplexy.

As we have before stated, the past season has been one of a character that has greatly increased the tendency to this disease and to all that partake of the nature of blood poisons, and as are of the same class as anthrax fevers.

The causes which tend to develop this disease are exposed pastures, without the proper shelter from the rays of August and early September sun, drinking stagnant water, often rendered still worse by the excretia of the animals themselves. In some cases, the trouble is aggravated by scanty pasture and impoverished blood. It is most prevalent among the better conditioned members of the herd, but is not confined to them to the exclusion of the others. The cases which this year have been brought to our notice have still further confirmed the theory, which is usually supported by local veterinarians, that this should not be classed in the list of contagious diseases. It is true that from the fact that it breaks out about the same time in several animals in the herd gives to it the appearance of being contagious, but in all cases which we have examined, the disease has been checked by removing all probable causes of its existence and propagation. In fact, all that we can advise is the removal of the cause and the administration of tonics of any available kind.

Anthrax, or Blood Poison.

Owing to the peculiarities of the season, which we have already noticed, all forms of anthrax fevers have been unusually prevalent, and have attracted more than usual attention. They have broken out in neighborhoods where they have been heretofore unknown, and from their alarming symptoms, have caused urgent appeals to the board for immediate assistance.

In referring in general terms to the different forms of this disease, Prof. James Law, in his *Farmers' Veterinary Adviser*, uses the following language:

> *Causes.*—It is propagated by contagion, but tends to die out when produced in this way alone. It is transmitted by contact with the blood, liquid exudations portions of diseased carcasses, fat, skins, hair, wool, bristles, feathers, and bowel evacuations, and rarely or not at all through the atmosphere. Simple contact of these matters with the healthy skin of a susceptible subject is enough to produce the disease. The virus is most potent when received from an animal still living, and only recently dead, and yet may be preserved for months in all conditions of climate, temperature, and humidity.

Its development is determined:

> 1. By the rich surface soil abounding in organic matter, and the impervious subsoil preventing natural drainage.
> 2. The frequent inundations of banks of rivers flowing through a level country, and the drying up of ponds and lakes leaving much organic deposit in their basins.
> 3. A continuation of warm, dry weather, which favors organic emanations from such places as the above.
> 4. A condition of the system of the animal predisposing to the reception and growth of poison, and consisting in loading of the blood with plastic or waste organic matter, as in overfed plethoric animals, in those taking flesh most rapidly, in the young and growing, in those rendered unhealthy by overwork, impure air, unsuitable food or water.
> 5. Sudden chills when the poison is already prevalent; hence extreme variations in temperature of night and day.
> 6. A close, still atmosphere.

During ten years experience with animal diseases, we have learned to expect frequent outbreaks of this character during the latter portion of August and early in September; in fact, we find them nearly all confined to the last two weeks in August and the first two in September; and if found before or after these dates, it is due to an unusually early or late development of that kind of weather and temperature which characterizes thedates which we have named. Stagnant ponds are reduced by evaporation and want of rain to a very small area. The water becomes heated above its usual temperature. All kinds of poisonous growths multiply with great rapidity. More than the usual amount of water is taken into the systems of the animals. This water contains many times its usual percentage of this poisonous growth, and the system is unable to throw it off as it may when the quality and surroundings are different. It rapidly multiplies in the system; the organs which remove the waste material become clogged and refuse to do their work; blood poisoning ensues, and is then propogatedby contagion. The fall of the first heavy rain, the equalization of the temperature of day and night, the first frost of the season, may, any or all of them, come to the relief of the animal, and the disease pass away as rapidly as it exhibited itself, often leaving the stock owner at a loss to account for its rapid ravages and his unexpected losses.

There is another great danger in connection with this class of disease to which the attention of our farmers should be urgently called, and that is their capability of transmission to the human race. In skinning animals which have died with these diseases, (especially in their more malignant forms,) if a cut or abrasion in the skin comes in contact with the diseased matter, death in its most horrible and painful form will be the result. No known cure can save the sufferer from an inevitable fate. In a case which was investigated by your officers, in Berks county, two lives were lost from this cause. The greatest care is needed to prevent loss of life and the spread of the disease by contagion. The surroundings of the infected herd should at once be changed; pure running water should be supplied; nutritious food should be given, not in large amounts, but in proper and reasonable amounts; pure air and plenty of shade or shelter from the hot sun should be at once afforded. All remains and excrements of the diseased animals should be deeply buried, or better still, burned. All articles or stables with which they have come in contact should not be again used until after freezing weather has killed the virus. Hot whitewash should be applied liberally to all woodwork with which the diseased animals have come in contact.

When the stock-owner has arrived at a point where he properly appreciates the causes which give rise to these diseases, he will at once, during the weather and surroundings which we have named, take due care that his animals are, as far as possible, removed from them, and that they have a reasonable chance to fight the diseases which may be introduced into their systems in so many different ways.

Husk or Hoose. (Verminous Bronchitis.)

In our search after contagious pleuro-pneumonia, we have found more than the usual number of cases of this disease prevailing among young calves and yearlings. A large number of calves and yearlings from New York State were sold and scattered through Lancaster county during last spring and winter. Many of these introduced husk or hoose into the herds into which they went, and from a similarity of outward symptoms, much unnecessary alarm was caused by the supposition that the disease was contagious pleuro-pneumonia. This was increased by the fact that the outbreaks of this latter disease were all caused (either directly or indirectly) by the same lot of young animals. All that is needed to convince even a novice in animal diseases is a post mortem. Husk is caused by the presence of large numbers of very minute strongoli, which are first introduced from a diseased animal, or which may be taken up from the pasture or drinking water to which diseased animals have had access. In no case can the disease originate in any herd; it must first come by the introduction of one or more of these minute strongoli, and when they are once introduced under favorable surroundings, they multiply with great rapidity, and soon, by stopping the air passages of the lungs cause death. The loss is mainly confined to yearlings and calves, but cases of death to larger animals have several times come under our notice. As a rule, a full grown and healthy animal can throw off the parasites without any serious inconvenience of labor to the lungs, and it is only in the weaker or small animals that they are specially dangerous to life.

It is an interesting fact in connection with the growth of these strongoli that, although minute and microscopic in their character, yet they too have parasites which prey upon them, as was proved by a microscopic examination made by S. E. Weber, D. V. S., of Lancaster, by which the parasitic life on the strongoli from the lungs of a colt were plainly shown.

The disease is common to all classes of animals, being readily transmissible to all; but, as before stated, is mainly dangerous when lodged in the system of a young or weak patient, whose system is too weak to throw them off by coughing, or whose lungs and bronchial tubes are too slightly developed to permit of this mode of relief.

ROPY OR VISCID MILK.

This pest of the dairyman has been reported in several localities during the latter portion of August and up to the middle of September. The regularity with which it occurs at or about this period each year would lead us to suppose that there was some connection between the weather and the disease. Practical dairymen disagree as to the exact cause, some assigning it to bad water, others to dirty surroundings, while others ascribe it to the cows having eaten some pernicious weed or vegetable growth. Our experience during the past ten years has clearly proven that each year it is met with in special locations in which none of these causes will account for its presence. Herds having unexceptionably clear water and clean surroundings have been affected; they have been affected during one season and have entirely escaped in others. Certain animals have been affected while the remainder of the dairy escaped. As no change of pasture was made, and as all had the same opportunity to eat any growth with which they came in contact, the weed theory entirely failed to account for the presence of the trouble.

In the years 1877–78–79, this disease (for we think it is due to disease) received the attention of Dr. Henry Leffmann, Microscopist of the Board, and after a careful investigation (microscopic and otherwise) of a number of affected dairies, and a number of samples of affected milk, he arrived at conclusions which he thus outlines:

I expressed myself last year, 1878, as opposed to the theory which ascribes the trouble to the growth of a fungus. My observations this year have confirmed me in this opposition. I have, of course, no doubt that fungus growths can be and indeed often are, found in the milk. I am forced, however, to the view that such forms are coincident and not causative. The primary trouble is, I think, in the animal furnishing the milk. The oil globules become changed, the albuminous covering becomes adhesive, perhaps by partial decomposition. This covering is doubtless not perfectly formed, and is incapable of resisting the decomposing influences around it, hence after the lapse of some hours we have the adhesiveness developed.

In referring to the various theories advanced to account for the disease, Dr. Leffmann thus refers to some of them:

> Those who favor the fungus theory assign various sources for the fungi, among others, impure water and barn-yard refuse. I pointed out in the report of last year (1878) that ropiness had occurred on one farm on which the water was excellent, and at another on which the stabling arrangements were exceptionally good. I am happy to add that the experience of this farm (near Limerick Station, Montgomery county,) has been wholly against the "dirty water" theory. The cattle drank more of a certain contaminated water this year than last, and have been entirely free from milk troubles. While, therefore, I incline to the view that the trouble is primarily in the (individual) cow, I am not yet in a position to define the nature of that trouble. It may be only a temporary disturbance of the secretions. Some farmers think that the trouble always begins about harvest time, and that certain weeds which come into prominence about that time are to blame for it, but against this view we have the early occurrence on certain farms.

Prof. James Law, of Cornell University, writes:

> The ropy character of milk appears to be due to the presence of some modified form of albumen or other nitrogenous substance. That it is not natural albumen of the blood is sufficiently evident, for the milk does not coagulate by boiling, as does that of the first few days after calving. That it is not fibrin, or rather its antecedents fiburlogen, fibro-plasten, &c., is equally patent, as there is no tendency to spontaneous coagulation in any varied conditions. It belongs apparently to the class of metalbumens, which are closely allied to the ordinary albumen in composition, but many of which, like that found in the horse's urine in disease, do not show the usual chemical reactions with heat, acids, &c. It has not been determined whether in all cases this metalbumen is derived from the nitrogenous element of the milk casein, or whether it is directly secreted from the blood, and due to some changes in that fluid or in the secreting follicles of the mammary glands. In some cases, it appears to be effected in the blood, or in distant diseased tissue, as in the case of metalbumen in the horse's urine, in connection with inflamed lungs, and when there was no manifest disease of the kidney. In some cases of ropy milk, there is a hot, congested, and knotted feeling of the udder, which might lead to the suspicion that the morbid process is concentrated there. We should, however, bear in mind that disorders in distant organs of the body, as above-mentioned, and in the blood-forming processes, often lead to the passage of albumen and its cogener (metalbumen) in the urine, and that simple congestion of the kidneys leads to the same result. It follows that the passage of albumen and its allies by the udder may equally depend upon very different disorders, near or remote, and, therefore, we must go beyond the mere presence of the element to find the cause of the trouble. It remains further to be determined in every case whether this change into albuminous material has been effected by the agency of the fungi existing in the blood, in the secreting follicles of the udder, or in the milk after it has been removed from the udder.

After alluding to the fact that when first drawn the milk has a perfectly natural appearance, and only shows the evidences of the disease after standing some time, Prof. Law writes as follows:

> Judging from this instance, therefore, we may easily conceive of the ropy milk being dependent in certain cases on the lack of perfect cleanliness, or of final thorough scalding of the milk dishes. It must be remembered that perfect safety demands that the dishes should be scalded and turned up to dry, and that the slightest contact of a solid body with their interior may deposit germs which will determine this and other changes of milk. In the same way the trouble may come from uncleanliness of the udder or the hands of the milker.

A careful investigation, as given by the officers of the Board, and an impartial consultation of reliable authorities upon the subject, leads us to draw the following inferences, which, to us, seem to be fully warranted by the facts:

First. That the trouble is very often not apparent when the milk is first drawn from the cow.

Second. That after standing a short time, the "ropiness" commences to develop and increases rapidly in extent and viscidity.

Third. That in many cases it is scarcely to be detected in the milk, but is shown to an unusual extent in the cream.

Fourth. That some cows are predisposed to it to a much greater extent than others.

Fifth. That it is more likely to show itself during hot weather following an unusually dry time.

Sixth. That it is often most prevalent during that portion of the season when the difference of temperature between the day and night is most marked, or when we have a succession of hot days followed by cool nights.

Seventh. That it is most prevalent when the animals are not provided with proper shade or other shelter from the hot sun.

Eighth. That it is most commonly absent or least prevalent during cool and moist summers and autumns.

Ninth. That animals with plenty of running water, shade, and regular supply of salt are rarely affected.

Tenth. That the theory that small doses of saltpeter administered every other day to the animals will cure and prevent the evil, has no foundation in fact.

Eleventh. That all of the surroundings of the disease lead to the conclusion that, whether caused by fungoid growth or not, it is in fact a species of partial decomposition.

Twelfth. That it is due to a disease in the system of the animal, and that, to be effective, all cures must begin there, and that external remedies, while they may possibly mitigate the trouble, are not to be depended on.

Thirteenth. That a careful examination of each cow's milk will usually show that the whole mixed milking is infected by the milk of a single cow, and that the evil is not as widespread as some are inclined to suppose.

Fourteenth. That the fact that, without any changes in the local surroundings, it will disappear as rapidly as it came, warrants the conclusion that it is due to some temporary disarrangement of some of the animal secretion.

Fifteenth. That in some cases, milking three times each day has entirely removed the difficulty, which, on a return to the plan of emptying the bag but twice a day, became as prevalent as before.

Sixteenth. That cows which have access at will to both upland (artificial) and meadow pasture, are least likely to be affected by the trouble.

Seventeenth. That the fact that single members of the herd will (during a whole season) show the presence of the trouble seems to disprove the theory that it is any way due to eating any special plant, for in such cases all would alike be subjected to the danger.

Eighteenth. That it is quite probable that any fungoid growth which may be found in the diseased milk may be the *result* of the partial decomposition, and not its *cause.*

Nineteenth. That the many cases which have been examined, being under all manner of conditions as to water and cleanliness, seem to warrant the conclusion that no matter what may be the effect of such surroundings *after* the disease has once started, they can hardly be accepted as its cause.

Twentieth. That all examinations lead to the theory that it is due to diseases in some organ, but not to a disease of any special organ, or, in other words, that it is the result of some disease in the system, and may be due to any disease.

THE BOUNTY LAW OF 1885.

During its session of 1885, the State Legislature acted favorably upon an act entitled "An act for the destruction of wolves, wild-cats, foxes, minks, hawks, weasels, and owls, in this Commonwealth."

The first section of this act is as follows:

"That for the benefit of agriculture and for the protection of game within this Commonwealth, there is hereby established the following premiums for the destruction of certain noxious animals and birds, to be paid by the respective counties, in which the same are slain, namely: for every wild-cat, two dollars; for every red or gray fox, one dollar; for every mink, fifty cents; for every weasel, fifty cents; for every hawk, fifty cents; and for every owl, except the Arcadian, screech or barn owl, which is hereby exempted from the provisions of this act, fifty cents."

Soon after the passage of the act, the correspondence of the Board clearly indicated that a wide dissatisfaction existed among the farmers of the State as to the provisions and action of the law, It was noted that while wolves are named in the title, they are omitted in the specifications of the first section; that there was a wide difference of opinion as to the benefit and injury to be credited to hawks and owls; that the several treasurers and commissioners of the respective counties were very much dissatisfied with the result of the first year's experiment under the act; that a strong attempt would probably be made to repeal the act, and that when the subject came up for action, the Legislature would probably have very little reliable data upon which to act. In order, if possible, to supply this deficiency, the attention of the Ornithologist of the Board was called to the subject, and an examination started, having for its object the determination of the exact nature of the food of the hawk and owl tribe. The initial steps demonstrated that of the large number of distinct varieties of hawks, but two were fairly charged with the destruction of poultry, and that the depredations (comparative) of even these had been considerably magnified. The result of this examination by an officer of our Board will be found in full in his official report in another portion of this volume. This report, with the attached evidence, is offered for the information of those who desire proper action in relation to the act.

The second and third sections of the act provide a plan by which, and under which, the bounties shall be paid by the respective county treasurers, and also the means by which imposition upon the county officers and magistrates may be prevented. The fourth section provides a penalty for any attempt at deception.

When the act was under consideration by the House Committee on Agriculture, the Secretary of the Board appeared before the committee, and asked that hawks and owls should be exempted from the provisions of the act. After considerable argument, the Arcadian, screech or barn owl, was exempted, but all other varieties were retained in the first section. The Secretary made the claim that the records of the Board proved that but two varieties of hawks were in the habit of committing depredations upon poultry, and that the benefit (to the

State at large) by the destruction of mice and insects by the other varieties much more than counterbalanced this loss. The careful and practical examinations of ornithologists more than verify the statements made before the committee, and it is now a question for the decision of the Legislature.

In order to ascertain the opinion of the treasurers and commissioners of the different counties in relation to the act, and to obtain the exact amount of the bounty paid under the act, the following circular was mailed to each:

Office Pennsylvania State Board of Agriculture.
Harrisburg, Pa., *November 16, 1886.*

Dear Sir: Sufficient information has already reached this office to make it evident that the coming Legislature will be called upon to take further action with reference to the act of June 23, 1885, entitled "An act for the destruction of wolves, wild-cats, foxes, minks, hawks, weasels, and owls in this Commonwealth," and, in order that such action may be such as will benefit the several counties of the State, and that the committees of both branches of the Legislature may have such information as will enable them to act properly in the premises, we are anxious to obtain information upon the following topics or branches of the questions, viz:

1. What is the total amount of bounty paid from your county treasury for this purpose since the act became a law?
2. What, in your opinion, or that of the county commissioners, would be the effect of repealing the act so far as it refers to hawks and owls?
3. What, in your opinion, or that of the county commissioners, would be the effect of repealing the whole act?

By furnishing me with answers to the above at your earliest convenience, you will confer a favor.

Respectfully yours,
Thos. J. Edge, *Secretary, &c.*
Harrisburg, Penna.

The replies received in answer to this circular show the following amounts to have been paid by the respective counties, from the date of the act (June 23, 1885,) to November 1, 1886. They are as follows:

Adams,	$3,800 00	Huntingdon,	$2,000 00
Allegheny,	53 00	Indiana,	1,251 05
Armstrong,	1,255 30	Juniata,	584 50
Beaver,	282 50	Lackawanna,	311 50
Berks,	607 90	Lancaster,	715 10
Blair,	800 00	Lawrence,	535 90
Bradford,	1,666 55	Lebanon,	202 20
Bucks,	444 30	Lehigh,	267 50
Butler,	833 75	Luzerne.	625 00
Cambria,	1,181 10	Lycoming,	1,039 00
Cameron,	130 00	McKean,	1,023 57
Centre,	1,827 05	Mercer,	2,319 70
Chester,	944 00	Mifflin,	357 60
Clarion,	944 00	Montgomery,	85 20
Clearfield,	1,500 00	Northampton,	381 60
Clinton,	325 00	Perry,	1,140 25
Columbia,	900 00	Schuylkill,	450 00
Crawford,	8,022 90	Somerset,	1,600 00
Cumberland,	500 00	Sullivan,	300 00
Dauphin,	450 00	Susquehanna,	1,200 00
Delaware,	10 20	Tioga,	1,169 00
Elk,	350 00	Union,	410 00
Erie,	2,746 00	Venango,	952 60
Fayette,	650 00	Warren,	1,893 25
Forest,	350 00	Washington,	727 50
Franklin,	967 00	Wayne.	1,400 00
Fulton,	700 00	Wyoming,	800 00
Greene,	1,200 00		

Assuming that these counties which have reported represent the average of the State, we may presume that the total payments on account of these bounties have been $72,750 during the past year. It is true that some of the statements are for the time which has elapsed since the passage of the act (or from June 23, 1885, to November 1, 1886,) but, on the other hand, a number of the county officers state that inasmuch as the act was not generally promulgated until November, 1885, the figures given fairly represent the bounties of one year. Several of the county treasurers report that there are outstanding orders for bounties due, which will considerably increase the amounts given by them; hence we think that is safe to claim that at least $72,750 has been paid out during the year ending November 1, 1886.

The answers of the county officers to the second and third inquiries of the circular vary very much, and we herewith give them in a condensed form, as nearly as possible in the language of the writers:

Adams.—"The law should be repealed except as to wolves, foxes, and wild-cats; the repeal as to hawks and owls would be a saving to the county of $2,500."

Armstrong.—"Repeal the whole act."

Allegheny.—"So far as this county is concerned, its repeal would not affect the number destroyed."

Beaver.—"The commissioners think that the whole act should be repealed."

Berks.—"Our opinion is that the whole act should be repealed."

Bucks.—"Think that the portion as to hawks and owls should be repealed, the balance of the act should remain as it now is."

Bradford.—"In the opinion of our county commissioners, hawks and owls are more beneficial to farmers than detrimental, but they are of the opinion that the whole act should be repealed for the following reasons:

1. It encourages hunting as an occupation.
2. Because the motives of self-interest will prompt the destruction of all these animals found doing damage.
3. Because of the drain upon the treasury."

Blair.—"The general impression is that the act should stand as it now is; there is no doubt that it is beneficial in our county and mountain districts. The effect of repealing the whole act would be very injurious, both to crops domestic and wild game. The law, as a whole, meets with general approval. The expense for the first year seems to be rather burdensome, but in the future it will be much less. There were some three hundred and fifty foxes killed since the law went into effect; and thus it will be but a short time until every destructive and noxious animal will be exterminated. What is true with regard to the fox is also true in relation to the others named in the act."

Butler.—"The act as a whole should stand as it is; that portion relating to hawks and owls should not be repealed."

Cambria.—"We favor the repeal of the whole law, and especially that portion referring to hawks and owls"

Cameron.—"The law should be repealed so far as it refers to minks, hawks, and owls. It has a tendency to encourage a certain class of men who devote their entire time to hunting."

Centre.—"We believe the act ought to be repealed as to hawks and owls. The effect of repealing the whole act would be a saving of thousands of dollars to the tax-payers annually. There would be about as many of the destructive animals and birds killed if the act was repealed, and by persons whose duty it is to protect their property. We emphatically favor repealing the entire act relating to bounties on scalps."

Chester.—"The opinion of the county commissioners and farmers generally is that the portion of the act referring to hawks and owls should be repealed. As to repealing the whole act, there is a difference of opinion; many do not favor the repeal as to foxes, minks, and weasels. We have paid bounties on the following: six hundred and sixty-six hawks, sixty owls, two hundred and eight minks, two hundred and forty-eight weasels and one hundred and seven foxes."

Clarion.—"We believe that the entire act should be repealed. Its repeal would be a benefit to the tax-payers, and no disadvantage to the farmers."

Clearfield.—"Two thirds of the amount has been paid upon hawks and owls; minks, hawks, and owls should be abandoned; panthers, wolves, wild-cats, and foxes should be retained."

Clinton.—"Think there might be a bounty on wolves, wild-cats, and minks; would be satisfied with the repeal of the whole act."

Columbia.—"Repeal it as to owls, as they feed on mice, &c. The bounty should be continued on hawks, as they feed mainly upon poultry. Repealing the whole act would have no injurious effect; the foxes would be killed in this county just the same. Weasels destroy rats, mice &c. Those who are injured by minks would kill them just the same without the law."

Crawford.—"The commissioners are of the opinion that the whole law should be repealed at the earliest possible moment. The commissioners are all farmers, and they consider the destruction of these animals and birds a great damage to the farmers; they are the farmers' best friends."

Cumberland.—"We do not see that our county will receive any benefit by continuing in effect any part of the act, and the repeal of the entire act will relieve the county of an unnecessary and unwarranted expense."

Dauphin.—"The repeal of the act would not affect the destruction of hawks and owls, as farmers, for self-protection, would destroy all they possibly could. Except as to wolves and foxes, we think the law should be repealed."

Delaware.—"Delaware county can get along very well without the law."

Elk.—"Repeal the whole act; there would be just as many killed."

Erie.—"It is our unanimous opinion that the entire act should be repealed; it is burdensome and inimical to the best interests of the farming community, and a useless expenditure of the county money."

Fayette.—"No complaints from the people at large. Much trouble to the county officers with the necessary papers, &c."

Forest.—"It would be wise to repeal the act as far as it refers to hawks, owls, and minks."

Franklin.—"The act ought to be repealed. Twenty-five wild-cats, four hundred and twenty-five foxes, one hundred and fifty-five minks, eighty-three weasels, six hundred and seventy-eight hawks, and sixty-eight owls"

Fulton.—"Our opinion is favorable to continuing the law as it now is."

Greene.—"Repeal the whole act, or at least that portion referring to hawks and owls."

Huntingdon.—"The law of 1885 should be repealed, and if any law is retained, it should be the same as the old law, having the orders directed to the county commissioners instead of to the county treasurers. It makes considerable extra work for the commissioners' clerk, and often puts persons entitled to an order to great inconvenience to have it signed by the county commissioners in order to get the money, as the commissioners in a majority of the counties only meet once each month. A majority of the people in the agricultural districts of this county would oppose a repeal of the act."

Indiana.—"Our opinion is that the bounty should be taken off everything mentioned in the act of June 23, 1885, and an act passed to pay a bounty for every skunk killed."

Juniata.—"The entire act should be repealed."

Lackawanna.—"We think that the whole act should be repealed, as it is a nuisance, especially so far as it refers to hawks and owls."

Lancaster.—"The repeal of the act would have a good effect so far as our county is concerned."

Lawrence.—"It is the unanimous opinion of the Board that the whole act should be repealed, believing that the law is entirely unnecessary so far as our county is concerned. We have not heard one farmer in the county approve it, but many of them condemn it. Its repeal is earnestly requested by all who have any knowledge of its workings."

Lebanon.—"The commissioners think that the part of the law referring to owls and hawks should be repealed by all means. Aside from the above (owls and hawks) we pay very little bounty, as foxes and other animals are not sufficiently numerous to affect our county."

Lehigh.—"Repeal the whole act if it can be done; if not, then repeal that portion referring to hawks and owls, by all means."

Lycoming.—"Its repeal would disappoint the farmers in this county. In their opinion, instead of a repeal, skunks or pole-cats should be added."

McKean.—"Think that the whole act should be repealed, or at least that part referring to hawks and owls."

Mercer.—"We are radically in favor of the repeal of the whole act, and in this we are supported by the sentiment of the entire farming community of our county."

Mifflin.—"We favor the repeal of that portion which relates to hawks and owls, and leaving the remainder as it now is."

Montgomery.—"The repeal of that portion relating to hawks and owls would be good."

Northampton.—"We are not in favor of repealing the act, and prefer it as it now stands."

Perry.—'The repeal of the law would be worse than useless. The money already paid in would be thrown away. In the future, fewer animals and birds will be found and destroyed; the number will gradually decrease each year."

Schuylkill.—"The repeal or non-repeal of the law is immaterial to us."

Sullivan.—"We have come to the conclusion that it would be for the best interests of this county to have the act repealed in full."

Susquehanna.—"Favorable to a repeal of the act."

Tioga.—"The act referred to is a nuisance, and should be repealed as soon as possible."

Union.—"The commissioners recommend the repeal of the whole bill, except as to foxes."

Venango.—"We are in favor of the repeal of the whole act, believing that it would give entire satisfaction to the tax-payers of our county."

Warren.—"Repeal the whole act by all means."

Washington.—"It is the opinion of the commissioners that the only damage by hawks and owls is the destruction of our game birds which is only felt by hunters; on the other hand, by the destruction of mice and other small vermin, they are beneficial to the farmer. The repeal of the whole act would be beneficial to our farmers."

Wayne.—"The county commissioners and a majority of the taxpayers of Wayne county are in favor of the whole act. Since the law went into effect we have heard very few, even of those who came here with claims for the bounty, say they favored the law as it stands."

Wyoming.—"The effect of the repeal would be good."

The arguments in favor of the repeal of the act may be thus summarized:

1. The act causes a drain upon the county treasury, which is not warranted by the benefits received.
2. Hawks and owls, by the destruction of insects, confer a benefit, which is more than an offset to the loss occasioned by their destruction of poultry.
3. A number of the county officers have been imposed upon, and bounties paid which were illegally drawn.
4. It causes an increase in the work and duties of county officers without providing extra compensation for it.
5. It encourages a certain class to follow hunting as an occupation.
6. Self-interest would lead to the destruction of these animals and birds without the law.

The arguments against the repeal of the law are:

1. This being the first year of its action, the total amount of bounty paid will greatly exceed that of subsequent years, and that, owing to the increasing scarcity each year, the amount will soon be very small.
2. By a repeal of the law, the bounties already paid will be practically lost.
3. The destruction of these animals and birds protects game.
4. All laws are subject to abuse and violation, and this is no exception to the rule.
5. The bounty upon foxes, minks, and weasels forms but a small proportion of the total amount, a number of the county officers stating that fully fifty per cent. of the amount is paid upon hawk and owl scalps.
6. Hawks and owls destroy so many small birds that their destruction will be a gain even in the destruction of insects.

In considering the question of repeal, it will be noted that a large number of the reports ask for a repeal of the act so far as it relates to hawks and owls, and the retention of the remaining portion. In favor of this, we have the above claim that such a change will reduce the amount of the bounties fully one half.

REPORT OF THE BOTANIST.

By THOMAS MEEHAN, *Germantown, Pa., Botanist of the Board.*

The correspondence of the Botanist of the Board the past year has been chiefly confined to answering inquiries for the names of strange plants, chiefly weeds, that came under the observations of correspondents, with some few inquiries relative to forestry matters.

No new weed has been brought to his attention, except a pretty blue-flowered plant of the Borage family, from the continent of Europe, named *Nonea pulla*, which, if it spread, will be no worse an evil than the average of spring-flowering annuals. Some foreign weeds seem to be getting more common. The common English Pimpernel, *Anagallis arvensis*, a small pink-flowered plant of the primrose family, is quite abundant in many grain fields in the eastern part of the State, but it is a comparatively harmless annual. *Hibicus trionium*, and *Abutilon Avicennæ*, tropical annuals, very abundant for years past in some parts of the State, among potatoes and in cornfields, have been sent from several localities where they have not been observed before, for name, which indicates that they are extending their lines of occupation. Clean cultivators have, however, nothing to fear from annuals of this kind.

It may be here noted that the spread of an introduced plant as a weed does not always depend so much on its being better adapted to our climate or soil than the native that it displaces. as it does on surrounding conditions wholly independent of soil or climate. For instance, the spread of the ox-eye daisy and buttercup in pastures is due to their being distasteful to cattle. Plants which cattle eat are kept to the ground and prevented from flowering and producing seed; while those they reject go to seed, spread, and soon occupy the land, crowding out those that have been weakened by close cropping. And the spread of chick-weed, shepherd's purse, and similar things that flower early in spring, proceeds from the fact that they mature seed, filling the earth with a supply for next season, before the farmer can get time from spring work to go over the ground and hoe them out. The English bindweed and the Canada thistle, very bad weeds on account of the fact that every small piece of root will grow, seem slightly on the increase in our State; but these will never be troublesome in corn growing regions, because a persistent use of the hoe-harrow for one, or at most two, years will utterly destroy any of these plants. The harrow must, however, be kept going as fast as the least vestige of foliage appears above the ground. The roots cannot live long without leaves during the growing season.

Those minute plants known technically as parasitic fungi, or in common language as blights, mildews, rusts, and moulds, have been more than usually prevalent this season, the moist season being apparently very favorable to the germination of the invisible seed-like spores from which they spring. These germinating spores seem to be always present in myriads, but it is only under a combination of rare circumstances that they seem to grow. One puff-ball will give off millions on millions of spores that float on the atmosphere for miles away. Yet the requirements for germination are so nice that we may not see a hundred puff-balls in the vicinity for years afterwards. For these reasons, we see that the usual recommendations to burn infested material is comparatively useless labor, unless we could be sure that we destroyed every infested part. The mildew which causes the potato rot has been particularly prevalent in the State this year. It was not so severe as it has been in some seasons in the past, but enough in some instances to blacken most of the leaves. The tubers, under these circumstances, will be liable to rot in the cellar before spring.

A curious discovery of the year is that the large crow's-nest branches often appearing on cherry trees is the work of a fungus closely allied to the fungus that produces the curl on the peach leaf. This is known as *Exaoscus deformans*. The cherry fungus has been determined by Prof. Farlow to be *Exoascus Wilsneri*. These "curled" cherry leaves prevent flower buds from forming; what would remain as flower buds push out into small branches instead, and hence we have a brushy mass of twigs instead of blossom spurs. As the fungus is confined to the "crow's-nest," the fact is of practical importance, as showing that the germs of these minute organisms do not spread so easily as supposed, or else the whole tree would have the curled leaf, and not merely have them confined to the "crow's-nests."

In the line of forestry, inquiry seems to indicate uncertainty in what kinds to plant. Some soils are not adapted to a kind of tree that may thrive very well a short distance away. Hence it often happens that trees are pronounced failures because of ignorance on the part of the planter. To succeed with trees, the seeds or seedling plants should be set in hills marked off at regular distances, as for corn-planting, and the ground kept clear for a few years by the hoe harrow, as in corn-growing. Experiments in forestry have, however, been made on but small scales, one of the best, perhaps, being by the Girard Trust in Schuylkill county.

Among the recent discoveries in botanical science that may prove of great value to the practical man, is the fact that male flowers, or the male parts of flowers, are excited to growth under a lower temperature than the female flowers are. Under this discovery, we are enabled to understand better why our crops of nuts or other fruits sometimes fail. For instance, in some seasons the shellbark, walnut, hazelnut, or filbert, and even acorns or maple seeds fail to give many seeds. In these the male flowers are separate from the female flowers. In the greater portion of those named the male flowers are in the form of cat-tails or aments, as they are botanically called, while the female flowers, finally yielding the nuts, are produced from the axils of other leaves, and are usually small and unconspicuous. Under the newly-discovered fact, a few comparatively warm days in winter will be sufficient for the development of the male flowers, while the females will keep patiently at rest. The catkins, as these male flowers are called, will mature sufficiently to discharge the pollen dust weeks before the female flower is advanced sufficiently to receive fertilization. When the regular season of enduring warmth opens, the female flowers appear, and die unfertilized; no crop can follow.

The same law follows in plants which have both sexes in the same flower, as in the pear, apple, peach, and other orchard fruits. An irregular warm temperature may bring forward the stamens long in advance of the pistils, and the anthers will shed the pollen before the pistils have advanced far enough to receive it. Short crops must inevitably ensue. Those seasons are, therefore, most favorable to the fruit-grower which continue equally cool till the regular spring-time arrives, when the temperature is so regularly warm that both the stamens and pistils—the male and female flowers—may advance simultaneously together. To some extent the fact has been nearly reached before. Fruit-growers have known that fruit trees on a sunny slope, flowering early, are unreliable bearers. But the reason was supposed to be that such early blossoms were "nipped by spring frosts," and this, to some extent, was true; but the full reason is the unequal development of the male and female organs. It is, therefore, a common recommendation, in horticultural works, to plant peach and other early flowering trees on northern slopes, where they may be less easily induced to flower early. Those who have filbert or hazlenut bushes may profit by this discovery of science, by gathering branches with the matured male catkins and folding them in newspapers, keeping them dry till the female flowers appear later; then take them from the paper and hang them among the bushes, that the wind may waft the pollen to the little blossoms. It is one of the rather recent discoveries of botany that pollen will retain its vitalizing powers for an indefinite period, if kept dry. The female flowers of the hazlenut are apparent to the superficial observer as fine, silk like threads, of a rosy pink color, pushing through what appears to be leaf buds. These, like the silk on an ear of corn, are the pistils that receive the pollen.

Many letters have reached the Botanist of the Board the past season respecting the premature decay of forest trees, in certain instances. Trees that are certainly not under the influence of old age have the outer or upper branches dead or dying. Trees in the vicinity of the Zoölogical Garden and Fairmount Park, Philadelphia, have been drawn to his attention as illustrative of this fact. The cause of death has frequently operated years before we see the result. In a very hot time, or very dry time, the roots are unable to supply the leaves with as much moisture as they require to supply transpiration. The outer branches—the farthest from the roots—suffer first. These branches do not die at first, but their vital power—the power of resistance to the efforts of death—is very much weakened. When a cold winter follows, these weakened branches are unable to resist as stronger ones would, and they die. A difficulty in obtaining food weakens the outlying branches just as much as a difficulty in obtaining drink. Trees require good food just as much as a crop of corn and potatoes. In the forest, old leaves, decaying branches, and rotting vegetation generally supply this food. In parks, all these remains are regarded as untidy. They are carefully cleaned away. Nothing in the shape of food is replaced for them. Besides this, the surface-roots are often destroyed in the work of gardening. The extremes of heat and cold injuriously affect the weaker branches. Where it is essential to keep trees in vigorous health, some fertilizing substances should be applied as a top-dressing to the surface. Where neglected trees are suffering, weakened branches should be cut away and a top-dressing applied.

What has been said of forest trees applies equally to trees in orchards. A well-fed, well-manured orchard will not die prematurely. Farmers cannot always have manure to spare for orchard trees, but it does no harm to know that those who can manure well will have the most enduring trees.

A student of one of our State colleges calls the attention of your botanist to a statement taught in his text-book, that the interior of trees is dead wood, the albumen or "sap-wood" being the only portions of a trunk having any life. He quotes from Goodale's edition of Gray's Text-book of Botany, page 81: "The heart-wood is no longer, in any sense, a living part; it may perish, as it frequently does, without affecting the life or health of the tree." The correspondent claims to be "the son of a lumberman," and has been taught that a dead tree, no matter how recently it may have parted with life—by fire or any other sudden circumstance—is of no use for lumber; and, as heart-wood is of great value, he thinks there is some conflict between science and practical observation. The doctrine, as stated in the extract given, is the universal teaching of botanists, and must, in the main, be true; and yet the point made by the young student is worthy attention. There is evidently a difference between dead wood, as understood by the botanist and by the lumberman. When death, in the ordinary acceptation of the term, occurs, disorganization, decay, at once begin their work. No disorganization is apparent in the heart-wood of a tree until after the tree has been severed from its roots, and we may, therefore, conclude that the tissue is not absolutely dead. Moreover, when this heart-wood actually "perishes"—that is to say, the trunk becomes hollow—the health of the tree is certainly not as good as when the center of the tree was heart-wood instead of rotten wood. Attention is called to this correspondent's inquiry here, because it indicates a questioning of nature on the part of the writer, which your botanist likes to encourage, as being in that spirit which lies at the foundation of many of the discoveries in science that have proved so useful to mankind. Such inquiries are always thankfully received.

THE SOURCES OF PHOSPHORIC ACID.

By F. A. GENTH, Jr., *Assistant Professor of Chemistry, Philadelphia.*

It is hardly necessary, at this late day, to call the attention of the farmer to the great part which phosphoric acid plays in the production of his crops.

Analyses of the ashes of plants by Liebig, Richardson, Way, Rammelsberg, Erdmann, and others, all tend to show the presence of that compound in varying quantities. Thus, the ashes of ripe seeds of wheat, oats, corn, peas, &c., contain from forty to fifty or more per cent., those of potatoes, turnips, and the like, from five to sometimes over twelve per cent. In fact, more or less phosphoric acid has been indicated in the ashes of pretty much all the plants that have been submitted to analysis.

This phosphoric acid is taken up from the soil by the roots of the plants, and, as we find vegetation everywhere, it must be very freely distributed throughout the world, and in such forms as may make it available to them.

If we examine the analyses of the majority of rocks, and their decomposition products, the soils, we shall find that they all contain more or less phosphoric acid; thus, taking those rocks from our neighborhood which were examined by Dr. F. A. Genth and myself for the Geological Survey of the State of Pennsylvania, we find that in the three counties of Bucks, Montgomery, and Philadelphia, dolerites, which were taken from near Quakertown, Lumberville, Brownsburg, New Hope, &c., were found to contain from twelve hundredths to three tenths of one per cent. of phosphoric acid. Diabase rock from near Morrisville contains two tenths of one per cent. Syenite gneiss from the vicinities of Morrisville and Feasterville, from one quarter of a per cent. or less, to three quarters of one per cent. The new red sandstone, north of Morrisville, was found to contain thirty-seven hundredths, and the amount in gneiss varies from a small fraction to over three tenths of one per cent.

These rocks are gradually decomposed by the combined action of water, atmosphere, and vegetation, the latter producing, among other things, carbonic and nitric acids, when decaying. The phosphoric acid, which is contained in the rocks mostly as apatite, although there as a very insoluble form of phosphate of calcium, is thus gradually acted upon and rendered available to the plants.

Numerous analyses of soils invariably show a small percentage of phosphoric acid, varying from a trace to perhaps one half of one per cent. We may safely put down the average amount of phosphoric acid in soils as fifteen hundredths of one per cent. The soil is therefore a rich store of slowly available phosphoric acid.

But, as the plants are constantly drawing from this supply and assimilating the phosphoric acid in their growth, it is quite evident that the soils will gradually become impoverished; hence, it should be the farmer's constant aim to make up the arising deficiency and to improve his lands whenever necessary, not only by putting phosphoric acid into it, but also by adding it in a form more available than the apatite in the decomposed rocks.

For this we must look to other sources. Formerly the principal source of phosphoric acid outside of the land itself was in the ordinary stable manure, but its use is limited and generally does not give a sufficient supply, the percentage of phosphoric acid in it being comparatively very small.

As in most other cases, when necessity calls for more of anything than the immediate surroundings can furnish, nature has given us great stores of phosphatic material in various forms. Vast deposits of mineral, fossil remains of animals and their excrements, numberless other sources, such as fish and bones, have all furnished their quota.

Bone.—The first and most important source of phosphoric acid is bone. If bone be burnt there always remains more or less of a residue which we call bone ash. The percentage of this bone ash varies according to the classes to which the animals belong. Thus, the quantity of ash in the bones of mammalia is about sixty-seven per cent., that of birds' bones a trifle higher, while the bones of fishes show amounts of ash, varying from two and two tenths of one per cent., as in the lamprey, to over sixty-seven per cent., as in the pike. For us, the bones of mammalia, and especially of the domestic animals, are of the greatest interest as sources of phosphoric acid.

By far the greatest portion of bone ash is composed of phosphate of lime, the other ingredients varying from one sixtieth to one seventh of the whole amount of the ash. Thus, the bones of an ox, for example, were found to contain about sixty parts of phosphate of lime in every seventy parts of ash, making, say, about forty per cent. of phosphoric acid in the ash, or about twenty-six per cent. of insoluble phosphoric acid in the raw bone. The amount of phosphoric acid in the bones of sheep, horses, &c., all show similar proportions. The most valuable form in which bones are used as fertilizers is *Raw bones*—because, besides the phosphate of lime which they contain, they also have another important ingredient, namely, nitrogen, which yields ammonia, the average amount of which in pure dry raw bone varies between four and one half to five and one half per cent.

When bones are scattered over a field and allowed to be acted upon by atmospheric influences, they will gradually give up this nitrogen, which, together with the products of the decomposition of some organic matter which they contain, render a portion of the phosphoric acid soluble. These substances are absorbed in the soil, and assimilated by the plants. Such bone, which is in the market as raw bone meal, bone dust, ground bone, &c., of varying grades of fineness, is most valuable in the form of very fine powder, because it is acted on very slowly when in a coarser state.

Bone ash is mostly obtained from South America, Texas, and other countries where the hides of animals were formerly considered of greater value than the animals themselves before their flesh was utilized, their bones burnt, and the ash sent to market. Very little bone ash is sold directly to the farmers; it is mostly converted into more available forms by treatment with sulphuric acid.

Another form in which the phosphoric acid in bone is often used for fertilizer purposes is the so-called *Spent bone black*. Bone black is prepared by burning raw bone in closed vessels so that the carbon remains finely disseminated throughout the phosphate of lime; in which condition, after being broken into a coarse powder, it is largely used for the purpose of decolorizing sugar solutions and abstracting lime, salts, &c. Its great power of absorbing coloring matters and certain inorganic salts renders it very valuable for that purpose. This bone black gradually loses the power of absorbing colors and salts, but can be revivified by repeated burning and lixiviation, so that it may be used repeatedly. Gradually, however, its pores become too much clogged, when revivification will no longer help it, whereupon it is sold either for manufacturing shoe-blacking, or to manufacturers of fertilizers. Many of the fertilizers in the market owe their dark color to this source.

Mineral Phosphates.—All phosphates which are found deposited in greater or less quantities in various parts of the globe may be classed in this category. Such are coprolites, guanos, phosphorites, apatites; also slags from certain processes in the manufacture of iron and steel from ores contaminated with phosphoric acid.

Coprolites, Phosphatic Nodules, &c.—True coprolites are the fossil excrements of extinct animals. They are sometimes found in working quantities in certain formations, especially in the lias; also in the cretaceous and tertiary, and are met with in many parts of the globe. Their composition varies, on account of the frequent admixture of sand and carbonate of lime, some showing about thirty-five per cent. of phosphate of lime, (equivalent to sixteen per cent. of phosphoric acid,) and again as much as ninety per cent. of phosphate of lime, (equivalent to forty-one and one fourth per cent. of phosphoric acid.) Dr. William Buckland first established the origin of these "*fossil fir cones*," as they were called by the people. The coprolites, from Gloucestershire, England, were, on an average, from two to four inches by one to two inches in size, oval shaped, spiral shaped, &c. They often contained bones, teeth, and scales of fossil fishes, and were determined to be the fossil excreta of gigantic reptiles and other animals (*Ichthyosauri*, &c.)

By coprolite is popularly meant all sorts of phosphatic nodules which may be used as manures, like those from the Coralline and Red Crags of Suffolk, England. These beds have been worked for forty years, producing a very large proportion of the phosphoric acid in England. Other beds in England are in Essex, Norfolk, and Cambridgeshire, the latter yielding about three hundred tons of phosphate to the acre. The average amount of phosphoric acid in the Cambridgeshire and Suffolk coprolites is about thirty-two or thirty-three per cent.

Other very large deposits of phosphatic beds, having also more or less animal remains of remote origin, are the great beds of central France. Very large deposits of the same occur in the departments Indre, Cher, and Mèvre. These beds are yielding large quantities of valuable phosphatic nodules.

Coprolites have been found at many other places, most frequently, however, in insufficient quantities for industrial purposes. The nodules occurring in South Carolina are probably only coprolites which have been more or less destroyed by water and agglomerated again in the form of nodules. In the Report for 1879 of the State Board of Agriculture can be found an extended article by Dr. Genth on the South Carolina phosphates. In it, the geological position, manner of discovery, together with several analyses, are described and given. Numerous analyses of the nodules and conglomerates in the so-called "Fish-beds" on the Ashley river show from fifty-five to sixty-five per cent. phosphate of lime, (equivalent to twenty-five to thirty per cent. phosphoric acid.) The outcrops of the beds of phosphatic nodules can be seen on the Ashley, Cooper, Stone, and other rivers. The area of these beds covers, probably, hundreds of square miles.

These nodules occur in a blue clay, varying from two inches to three feet in thickness. The deposits form no regular stratum, but are detached, and at irregular intervals along the river banks. Remains of animals, in the shape of large shark's teeth, bones, &c., are often found with them.

North Carolina and Alabama also contain beds of phosphatic material, although not so rich as those from South Carolina.

Coprolites, South Carolina nodules, and similar rock phosphates are seldom used as direct fertilizers, as they contain the phosphoric acid mostly in an unavailable form. Even if reduced to an impalpable powder, they are but slowly acted upon by the solvent power of the soil and decaying vegetation. They are, however, a most valuable material for the manufacture of acid phosphates and fertilizers in which these form a component part.

Apatite, Phosphorite, Staffelite, &c.—Apatite, a phosphate of lime, with calcium fluoride, is found in hexagonal crystals, thus forming beautiful ornaments of many mineral cabinets, but it also occurs in various varieties, in large massive deposits. It is one of the most universally distributed minerals, occurring chiefly in rocks of various kinds and ages, and forming, according to Gasparin, from two tenths of a per cent., as in certain granites and limestones, to three per cent., as in lavas. Besides these rocks, it is often found in iron ore beds, sandstones, shales, &c., in fact, in all formations, from the Laurentian to the youngest periods, we meet with it, either as apatite, or altered into some other phosphate.

In South Norway, apatite occurs in large quantities. A coarse crystalline apatite is shipped from Krageroe to England.

Analyses of apatites from Snarum, Arendal, &c., gave ninety-two per cent. phosphate of lime; other Norwegian apatites gave Voelcker eighty-nine to ninety-three per cent. of phosphate of lime.

The principal apatite beds in America are in Canada, in North Elmsley, passing into South Burgess. One is ten feet wide, three of which are pure apatite, and the mass on both sides of this being a mixture of the same and limestone.

Analyses of this Canadian apatite gave Voelcker about ninety per cent. of phosphate of lime. The apatite from Canada, which is furnished to the home market, and exported to Europe, yields, on an average, between thirty-five and forty per cent of phosphoric acid.

The so-called "*phosphorite*" is a massive and often fibrous variety of apatite known for nearly one hundred years, from Estremadura in Spain, where it forms very large deposits, which, like some similar ones in Portugal, are worked very extensively, and furnish most excellent material for the manufacture of fertilizers.

In Nassau, Germany, there are very interesting phosphoric beds, which are especially well developed at Staffel and at Diez. The mineral forms often fibrous incrustations, which have been named Staffelite, and yield's frequently as much as thirty-five per cent. of phosphoric acid. They are wrought extensively, and are of the greatest importance in the fertilizer industry of Germany.

Similar to apatite and its varieties, are some of the rock guanos which contain only unavailable phosphoric acid, and for this reason are only used after the phosphoric acid has been rendered available by the action of sulphuric acid.

In connection with this, I should mention peculiar varieties of rock guanos, which are obtained from some islands in the Carribean sea, in which water, containing phosphoric acid, also alumina and iron, has been percolating coral rock underneath, and has changed it into phosphatic rock guano—rarely nearly pure phosphate of lime, but frequently containing large quantities of phosphates of iron and alumina. The rock guano from El Roque is almost pure phosphate of alumina, and it has been worked up in England into alum and soluble phosphates. I understand that works for this purpose have been started in Philadelphia, but I am not aware that any of their products are on the market.

Guanos.—They are mostly the results of the alterations of bird-dung and the decaying dead animals. Where this is deposited, in regions which are rarely visited by rain, as on the Chincha islands on the coast of Peru, or Saldanha Bay, on the west coast of Africa, a guano is formed in which the nitrogenous matter is largely converted into ammonia, uric acid, nitric acid, &c., which all are valuable as fertilizers on that account. The phosphoric acid which they contain is, to a very great extent, in an available form, readily assimilated as plant food. To this class belong several varieties of Peruvian guano, which will yield from eight to seventeen per cent. of ammonia, and ten to twelve per cent. of phosphoric acid, and two to four per cent. of potash. Soldanha bay, on the west coast of Africa, furnishes a guano with eight per cent. of ammonia and over ten per cent. of phosphoric acid.

At localities, however, where rain gradually washes out the organic constituents and alkaline salts, guanos are left, containing far smaller quantities, and frequently not any nitrogenous organic substances and potash salts, the phosphoric acid still being more or less in the available form.

Numerous islands in the Pacific ocean, such as Baker, Jarvis, Shaw's, and others, (especially Mejillones islands off the coast of Bolivia,) are very important localities for phosphatic guanos, yielding from twenty-five to thirty-five per cent. of phosphoric acid. In the Carribean sea on the coast of Venezuela, and in many localities in the Gulf of Mexico, phosphatic guanos of a similar kind are found, and are frequently sold as direct fertilizers to farmers. A few still contain small quantities, from a trace to four per cent., of ammonia and nitric acid, and a little potash ; most of them, hardly any, but all have phosphoric acid present, partly in the available form.

Bat guano is the name of certain phosphatic deposits which have been developed, and which were found to contain the remains and excrements of bats and other small animals. As these guanos are formed in caves where rain has no chance to wash them out, they frequently contain considerable quantities of nitrogen in an available form, a great part oxidized to nitric acid, yielding from some deposits in Arkansas from three to ten per cent. of ammonia. Similar deposits have been found in Texas. The Bahama, or Guanahani guano is also a bat guano, an average of different samples gave about two per cent. of ammonia and thirteen and one half of phosphoric acid.

Thomas scoria.—It is well known that one of the reasons why many rich iron ores were unfit for making good iron was the high percentage of phosphoric acid which they contain. By the ordinary process of making cast-iron, almost the whole amount of phosphorus would enter the pig-iron, making the latter almost worthless for producing wrought-iron or steel.

Gilchrist Thomas has introduced a process by which such pig metal can be deprived of its phosphorus, and the latter oxidized into phosphoric acid and absorbed by lime. This is known as the "basic process." The scoria which is obtained by it contains almost the whole amount of the phosphorus, and the iron is left nearly free from it. Some of this scoria, reduced to a very fine powder, has been imported into this country. It is manufactured at Peine, in Hanover, and is sold as "Peine-Thomas scoria." A sample which Doctor Genth has analyzed for the State Board of Agriculture gave twenty and one hundredth per cent. of phosphoric acid, nine and eighty-eighth hundredths of which was available.

The insoluble, or unavailable, phosphates, such as bone ash, bone black, coprolite, apatite, South Carolina rock, &c., are generally converted into soluble (acid phosphates or superphosphates, &c.,) by treatment with sulphuric acid. It is then that the great stores of phosphoric acid are opened up to the farmer, whereby he is enabled to help nature in giving the plants their proper food.

There are many other sources of phosphoric acid that might have been mentioned in this paper, but from what we have here already we can form an adequate idea as to our resources of the same.

THE OWL FAMILY.—FOOD, HABITS, &c., WITH SPECIAL REFERENCE TO SPECIES FOUND IN EASTERN PENNSYLVANIA.

By B. H. WARREN, M. D., *West Chester*, *Pa.*, *Ornithologist of the Board.*

The owls constitute a division of the order *Raptores*, and inhabit every quarter of the globe; while certain species confine themselves to the ice-bound Polar regions, others find a congenial habitat beneath a tropical sun. They frequent both populous districts and desert tracts; generally speaking, however, woodland areas and meadow lands are their favorite resorts. Some few species obtain their food during the day, still they are for the most part nocturnal. During the daylight they remained concealed in hollow trees, caverns, or dense foliage, preferably cedar thickets, until the hour of twilight has arrived. They never feed on carrion, but subsist on such food as they are able to kill. Their dietary, although variable with locality and circumstances, consists mainly of small quadrupeds, (principally field mice,) insects, chiefly beetles and grasshoppers, and some few of the smaller kinds of birds. Many species are capable of living without water for months at a time, though some of them drink it readily, and often bathe freely.*

Most of the members of this sub-order lay from two to five round, white eggs, which are deposited in holes in trees, rocks, or the deserted nests of hawks and crows.

The owls, collectively considered, possess an apparently heavy, but in reality, slender body, and a large, broad, thickly-plumaged head. The plumage of the body is made up of long, broad feathers, and is so extremely soft and downy as to render the owl's flight almost noiseless. The coloration is, in most species, somber. The auditory organs are highly developed; the external ear in many individuals being furnished with a kind of lid, that gives material aid in the collection of the wave sounds.

It has been said that "all birds of the owl kind may be considered as nocturnal robbers, who, unfitted for taking their prey while it is light, surprise it at those hours of rest, when the tribes of nature are in the least expectation of an enemy. Thus there seems no link in nature's chain broken; nowhere a dead, inactive repose; but every place, every season, every hour of the day and night, is bustling with life, and furnishing instances of industry, self-defense, and invasion."

In Pennsylvania, we have eight species of the nocturnal *Rapacia*, viz: Great-horned, Long-eared, Screech, Short-eared, which constitute a class known as the tufted or horned owls; with the exception of the short-eared species all are resident in this Commonwealth. The second sub-division of this class, denominated Smooth-headed owls, includes the Barn, Barred, Snowy, and Acadian owls. Of the Barn and Snowy owls it may be remarked that neither breed in this State. They occur here as transitory visitants. The Snowy owl is indigenous to the snow-bound regions of the Arctic wilds. It is only during very severe winters that straggling individuals of this species wander as far south as Pennsylvania. The Barn owl, whose peculiar physiognomy has won for it the appellation "monkey-face," is a Southern bird.

The Acadian owl occurs here as a winter resident; not plentiful.

The Barred owl is also a species which does not breed in this section of Pennsylvania, where it is found as a winter sojourner.

While it is generally an accepted fact that owls are nocturnal in their habits, it is not true that they are exclusively so. The Smooth-headed owls are of a decidedly diurnal and crepuscular nature, and of the horned owls it might be added that in cloudy weather or in the early twilight it is by no means an unfrequent occurrence to see the Long-eared, Screech, and even the Great-horned owls sally forth in quest of prey.

The discordant, at times even hideous, voice of the owl has always been considered among the ignorant and superstitious as a presage of some sad calamity that was soon to ensue.

Illustrative of this superstition, an English writer says: "During my absence, the Barn owl had a sad time of it at Walton Hall. Its supposed mournful notes alarmed the aged house-keeper. She knew full well what sorrow it had brought into other houses when she was a young woman; and there was enough mischief in the midnight wintry blast without having it increased by the dismal screams of something which people knew very little about, and which everybody said was far too busy in the church-yard at night time. Nay, it was a well-known fact, that, if any person was sick in the neighborhood, it would be forever looking in at the window, and holding a conversation outside with somebody, they did not know whom. The gamekeeper agreed with her in everything she said on this important subject, and he always stood better in her books when he had managed to shoot a bird of this bad and mischievous family. However, on my return from the wilds of Guinea, having suffered myself, and learned mercy, I broke in pieces the code of penal laws which the knavery of the game-keeper and the lamentable ignorance of the other servants had hitherto put in force, far too successfully, to thin the numbers of this beneficial, harmless, unsuspecting tribe.

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* Benjamin M. Everhart, a Chester county naturalist, had in captivity for a period of about two years a Great Horned owl, and during this time he says: "It never would drink water."

"On the ruin of the old gateway, against which tradition says the waves of the lake have dashed for the better part of a thousand years, I made a place with stone and mortar, about four feet square, and fixed a thick, oaken stick firmly into it. In about a month or so after it was finished, a pair of Barn owls came and took up their abode in it. I threatened to strangle the keeper if ever after this he molested either the old birds or their young ones; and I assured the housekeeper that I would take upon myself the whole responsibility of all sickness and sorrow that the new tenants might bring into the hall. She made a low courtesy, as much as to say: 'Sir, I fall into your will and pleasure,' but I saw in her eye that she had made up her mind to have to do with things of fearful and portentous shape, and to hear many a midnight wailing in the surrounding woods. I do not think that up to the day of this old lady's death, which took place in her eighty-fourth year, she ever looked with pleasure or contentment on the Barn owl, as it flew round the large sycamore trees, which grew near the old, ruined gateway."

Having thus far made a somewhat desultory review of the owls, I now desire to call your special attention to the nature of the food of our native species. As these birds are generally inactive during the daytime, and obtain their prey at night, the generality of mankind are wont to regard them with disfavor, and attribute to them deeds of rapine, which certainly a careful study of their habits and food materials will not warrant.

Ignorance of the usefulness of the Raptorial birds, and superstitious notions on the part of the laity, have induced our Pennsylvania legislators to pass an act providing for premiums of fifty cents per head for hawks and owls taken in this Commonwealth. As a natural outcome of such legislation, we find trappers, hunters, and small boys ever on the alert to secure "scalps." By reference to the records in the Chester county commissioners' office, it will be seen that bounties amounting to over eight hundred and forty-one dollars have been paid on six hundred and sixty-six hawks and sixty owls within a period of less than six months. This sum of money has been taken from the county's coffers in the alleged "interest of agriculture." Stimulated by the sake of pecuniary gain, residents of this county have shot, caught, and trapped on all occasions every attainable hawk and owl. As such merciless slaughter progresses, we see the ubiquitous small boy and able-bodied men spare not even the half-fledged nestlings. In this connection, it might be added that with the exception of the Cooper's and Sharp-shinned hawks, all the species found in eastern Pennsylvania are among the best feathered friends that the farmers have. This statement is especially true with regard to the Sparrow-hawk, the smallest representative of the North American falcons, which, unhappily, have been slain by dozens.

In returning to my subject proper, would state that I present to your consideration the views of certain of the most eminent ornithological specialists in America, and the result of fifty-odd stomach examinations of owls captured in Chester and Delaware counties during the last eight years.

This evidence and array of facts all tend to prove the great economic value of the owl tribe.

Great Horned Owl.

Audubon says: "Its food consists chiefly of the larger species of gallinaceous birds, half-grown wild turkeys, pheasants, and domestic poultry of all kinds, together with several species of ducks."

Wilson observes that "it preys on young rabbits, squirrels, rats, mice, partridges, and small birds of various kinds. It has been often known to prowl about a farm-house, and carry off chickens from roost."

Gentry, in Life Histories of Birds of Eastern Pennsylvania, says: "The food of this species consists of small quadrupeds, small birds, and insects. The poultry-yards are not safe from its nocturnal ravages. Instances are known where, in the course of a few nights, entire roosts have been completely destroyed. The food of the young at first consists of fragments of the animals and reptiles taken captive, besides various lepidopterous and coleopterous insects."

Nuttall tells us they usually prey on young rabbits, squirrels, rats, mice, quails, and small birds of various kinds; and when these resources fail or diminish, they occasionally prowl pretty boldly around the farm-yard in quest of chickens, which they seize on the roost.

Nuttall further writes: "My friend Dr. Boykin, of Georgia, says a Great-horned owl, prowling around his premises, saw a cat dozing on the roof of a smoke-house, and supposing grimalkin a more harmless, rabbit-like animal than appeared in the sequel, blindly snatched her up in his talons, but finding he had caught a Tartar, it was not long before he allowed puss once more to tread the ground."

My own records of sixteen examinations of Great-horned owls, which, with one exception, were all taken during the winter months, revealed in eleven individuals only remains of poultry; two others, portions of rabbits, and of the three remaining birds of this series it was found that one had taken two mice; another showed small amount of hair, apparently that of an opossum. The sixteenth and last bird contained a mouse and parts of beetles.

The Long-Eared Owl.

This species is probably the most abundant of all owls in eastern Pennsylvania, and unlike other of its congeners is, during the winter months, gregarious. Having had abundant opportunities of studying the food-habits of this bird in this section, I assert, without hesitancy, that its fondness for mice is such that it will not subsist on other food unless forced to do so. I have examined the stomachs of twenty-three Long-eared owls, and found that twenty-two of them had taken only these rodents; the other examination made of a bird taken in the late spring, showed some beetles and portions of a warbler (small bird).

Referring to this species, Audubon says: "It preys chiefly on quadrupeds of the genus *Arvicola*, and in summer destroys many beetles."

Nuttall observes: "Besides mice and rats, this species also preys on field-mice, moles, and beetles."

In conculsion, I would state that, not desiring to occupy too much space with the dry details of post-mortem researches, I have made special comment only on such owls as breed and are commonly known in this district (Chester and Delaware counties). The food materials of the other species of owls mentioned in the forepart of the paper do not materially differ from those of our native species.

In relation to the act of Assembly, passed June 23, 1885, generally known as the "scalp act," I desire to call the reader's attention to a report adopted at a regular meeting of the West Chester Microscopical Society, held March 4, 1886. In addition to said report, I take great pleasure in presenting to you letters from some of the most eminent naturalists of this country.

The Screech Owl.

Prof. Samuel Aughey, of Lincoln, Nebraska, writes that this species is largely an insect-eating bird, and in support of such assertion he presents the following results of dissections that he has made:

DATE OF EXAMINATION.	Locusts in stomach.	Other insects.	Remarks.
September, 1867,	47	12	
September, 1867,	82	8	Small bird.
June, 1868,	41	22	
July, 1869,	....	69	Mouse.
August, 1870,	....	38	Mouse.
September, 1872,	....	67	
September, 1874,	50	16	
June, 1875,	49	15	

Mr. L. M. Turner, of Washington, D. C., a member of the scientific corps of the Smithsonian Institution, informed me that he had dissected a number of screech owls, captured in Illinoies at different seasons of the year, and had very generally found their food consisted of such insects as the larger beetles and grasshoppers; also, many field-mice.

In a series of fifteen examples of this species taken in Pennsylvania, I found that thirteen had fed entirely on insects and field-mice; two, small birds, sparrows.

Report of Committee.

The committee appointed at the last meeting of the Microscopical Society to take into consideration the act of Assembly passed the 23d day of June, A. D. 1885, entitled "An act for the destruction of wolves, wild-cats, foxes, minks, hawks, weasels, and owls, in this Commonwealth," and which reads as follows: "That for the benefit of agriculture, and for the protection of game within this Commonwealth, there is hereby established the following premiums for the destruction of certain noxious animals and birds, to be paid by the respective counties in which the same are slain, namely: For every wild-cat, two dollars, for every red or gray fox one dollar, for every mink fifty cents, for every weasel, fifty cents, for every hawk, fifty cents, and for every owl (except the Acadian screech or barn owl, which is hereby exempted from the provisions of this act) fifty cents;" beg leave to report that the chairman of the committee, Dr. B. Harry Warren, Ornithologist of the Pennsylvania State Board of Agriculture, has devoted several years of his life to the collection, dissection, and examination of birds, and that all of the committee from observation and experience have believed that all of the birds denounced in the law above quoted, with rare exceptions, have been found to be the best friends of the farmer. Lest, however, any of the committee might be mistaken, they have corresponded with the best ornithologists in the country, men who have made ornithology a study, and are connected with that department in the Smithsonian Institution, asking their opinion as to the benefits or injury likely to arise from the execution of the law against the birds therein named.

They have received answers from Dr. C. Hart Merriam, Ornithologist of the United States Department of Agriculture; Robert Ridgway, Curator of Department of Birds, United States National Museum; Dr. Leonard Stejnegers, Assistant Curator of the same department; H. W. Henshaw, of the Bureau of Ethnology, also a collector of birds for the Smithsonian Institution, and connected with the late Wheeler Survey of the Territories, and Lucien M. Turner, a collector of birds, etc., for the Smithsonian Institution for the last twelve years. These answers, which are annexed to this report, all bear testimony that the hawks and owls are of great benefit to the farmer, and render him far greater service than injury, and that it is unwise to select any of them for destruction.

The committee regrets to say that there have been ninety-odd hawks and a dozen or more owls killed since the law was passed June 23, 1885, at a cost to this county of about seventy-five dollars, and that the slaughter is still going on.

Believing, therefore, that the killing of these birds is detrimental to the interest of the agriculturists, they believe that instead of being destroyed they should be protected, and they, therefore, recommend the passage of the following resolution:

Resolved by the Microscopical Society of West Chester, That in the opinion of the society the act of June 23, 1885, offering a premium for the destruction of hawks and owls, is unwise and prejudicial to the interest of agriculture, and, so far as those birds are concerned, ought to be repealed.

Resolved, That the president and secretary of the society be instructed to forward a copy of the above resolution to our members of the Legislature at its next session, and request their aid towards the repeal of the act so far as is above stated.

All of which is respectfully submitted.

B. HARRY WARREN,
W. TOWNSEND,
THOS. D. DUNN,
JAMES C. SELLERS,
Committee.

March 4, 1885.

Dr. C. Hart Merriman.

U. S. DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., *March 2, 1886,*

DR. B. HARRY WARREN, *Ornithologist of the Pennsylvania State Board of Agriculture:*

DEAR SIR: Your letter of the 1st instant has just come to hand. I have read with surprise and indignation, the copy sent of section 1, page 141, of the laws of Pennsylvania for 1885, in which a bounty is offered for the destruction of weasels, hawks, and owls. The clause purports to have been enacted "for the benefit of agriculture," &c.

The possibility of the passage of such an act by any legislative body is a melancholy comment on the widespread ignorance that prevails, even among intelligent persons, concerning the food of our common birds and mammals and is an evidence of the urgent need of just such systematic and comprehensive investigations as this department is now making on the subject of the relation of food habits to agriculture.

There are two kinds of weasels in the Eastern States. The smaller kind feeds chiefly on mice and insects, and is not known to kill poultry. The larger also preys mainly upon mice and rats, but in addition sometimes kills rabbits and poultry. Both species are friends of the farmer, for the occasional loss of a few chickens is of trifling consequence compared with the good that these animals are constantly doing in checking the increase of mice.

You ask my opinion in regard to the beneficial and injurious qualities of the hawks and owls which inhabit Pennsylvania. This question seems almost surperfluous, in view of the fact that your own ivestigations, more than those of any other one person, have led to a better knowledge of the food-habits of these birds; and what you have done in the East, Prof. Aughey, of Nebraska, has done in the West. Many others have added their "mites" till at the present time a sufficient array of facts has been accumulated to enable us to state, without fear of contradiction, that our hawks and owls must be ranked among the best friends of the farmer. With very few exceptions their food consists of mice and insects meadow-mice and grasshoppers predominating. The exceptions are the fierce Goshawks, from the North, and two smaller resident hawks, Cooper's and teh Sharp-shinned, which really destroy many wild birds and some poultry. These three hawks have long tails and short wings, which serve, among other characteristics, to distinguish them from the beneficial kind.

Strange as it may appear to the average farmer, the largest hawks are the ones that do the most good. Foremost among these are the Rough-legged and Marsh hawks, which do not meddle with poultry and rarely prey upon wild birds.

Of hawks and owls collectively, it may safely be said that, except in rare instances, the loss they occasion by the destruction of poultry is insignificant in comparison with the benefits derived by the farmer and fruit-grower from their constant vigilance; for, when unmolested, the one guards his crop by day and the other by night.

It is earnestly to be hoped that you will succeed, not only in causing the repeal of the ill-advised act which provides a bounty for the killing of hawks and owls but that you will go further, and secure the enactment of a law which will impose a fine for the slaughter of these useful birds.

Very truly yours,
C. HART MERRIMAN,
Ornithologist of the Department of Agriculture.

H. W. Henshaw:

WASHINGTON, *March 3, 1886.*

B. H. WARREN, M. D., *West Chester, Pa.*:

DEAR SIR: In reply to your favor of the 1st instant, asking for my opinion with regard to the economic utility of the birds of prey, I take pleasure in responding as follows: To the ornithologist, whose business it is to study the habits of birds, the wide-spread ignorance of the habits of the hawk and owl tribe, and the mistaken idea as to the amount of injury they do are almost inconceivable.

So common however, are these erroneous ideas respecting the birds of prey and their relations to the farmer and agriculturist, that it is not at all surprising that laws similar to the one now in force in Pennsylvania should be enacted.

Your own investigations into the nature of the food of the birds of prey of your county might be cited in support of the statement that such enactments are based upon erroneous conceptions I may add that wherever such investigations have been systematically conducted, they have resulted in a verdict favorable to the birds of prey. In almost every portion of this country, I have found the opinions of all field ornithologists to be in favor of the preservation of the hawk and owl tribe on account of the good they do. I believe the time will come when the farmers, as a class, will carefully protect the hawks and owls on the ground of their beneficent services.

Following is the list of species most numerous in your State.

1. Marsh hawk, (*Circus cyaneus hudsonius.*)
2. Sparrow hawk, (*Falco sparverius.*)
3. Red-shouldered hawk, (*Buteo lineatus.*)
4. Red-tailed hawk, (*Buteo borealis.*)
5. Cooper's hawk, (*Accipiter cooperi.*)
6. Sharp-shinned hawk, (*Accipiter fuscus.*)
7. Broad-winged hawk, (*Buteo pennsylvanicus.*)
8. Rough-legged hawk, (*Archibuteo lagopus sancti-johannis.*)
9. Short-eared owl, (*Asio accipitrinus.*)
10. Screech owl, (*Scops asio.*)
11. Long-eared owl, (*Asio wilsonianus.*)
12. Barred owl, (*Strix nebulosa.*)
13. Horned owl, (*Bubo virginianus.*)

Of this list, the Marsh hawk, Red-shouldered hawk, Red-tailed hawk, Broad-winged hawk, Rough-legged hawk, Short and Long-eared owls, Screech owl, Barred owl and Horned owl are of very great value to the agriculturist because of the immense numbers of meadow mice and other small rodents they annually destroy. The mice, when unchecked, increase with amazing rapidity, and the hawks and owls above-named are among the chief natural means for their destruction, mice and other rodents forming a large percentage of their food. The harm the hawks do in the destruction of small birds is inconsiderable compared to the benefits derived by the farmers from the destruction of the four-footed pests. The owls particularly work by night, and hence the benefits they confer are easily overlooked.

The Sparrow-hawk is one of the most harmless of birds, and one of the most beneficial to man. He lives almost exclusively upon grasshoppers and crickets, and the number of the former destroyed by these birds is incalculable.

I mention the Cooper's and Sharp-shinned hawks last, because they unquestionably kill many small birds, and they also commit depredations upon the poultry yard. I believe however, they can safely be left to be dealt with by the class they injure, chiefly poultrymen. To place all the hawks and owls under ban, and to attempt their extermination simply because one or two species are injurious, is certainly not good policy.

After more than twenty years' study of birds, I am decidedly of the opinion that the hawks and owls, as a class, are of great economic value, and that no State in which agriculture is pursued to any extent can afford to dispense with their services. They not only ought not to be exterminated, but they should be placed upon the list of birds protected by law.

I am, very truly, yours,
H. W. HENSHAW.

Robt. Ridgway:

UNITED STATES NATIONAL MUSEUM,
UNDER DIRECTION OF THE SMITHSONIAN INSTITUTION,
WASHINGTON, *March 3, 1886.*

Dr. B. H. WARREN, *West Chester, Pa.:*

DEAR DR. WARREN: I am just in receipt of your letter of the 1st instant, and, therefore, fear that my reply cannot reach you in time for use at the meeting, to-morrow evening. It affords me much pleasure, however, to comply with your request for my views concerning the food-habits of hawks and owls, and their relation to man.

Of all the species which you name, there are only two which, according to my best judgment, are at all seriously destructive to game or poultry, these being Cooper's hawk and the Great-horned owl. The rest, with the possible exception of the Sharp-shinned hawk, which certainly is destructive to the smaller birds, my experience leads me to regard as *very decidedly* beneficial to man, their food consisting very largely, if not chiefly, of the smaller rodents, field-mice especially. The Red-shouldered and Red-tailed hawks occasionally pick up a young chicken or rabbit, but I feel quite sure that their service to man far outweighs the injury which they thus do. The little Sparrow-hawk and other smaller species destroy large numbers of grasshoppers, locusts, and other large insects.

Very truly yours,
ROBERT RIDGWAY,
Curator, Dept. Birds.

Dr. Leonard Stejneger:

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C., *March 3, 1886.*

Dr. B. H. WARREN, *West Chester, Pa.:*

DEAR DOCTOR: In reply to your letter of the 3d instant, asking for my opinion in regard to the food, etc., of certain hawks and owls specified, I would state that I have read Mr. Robert Ridgway's answer to a similar request from you, and that I agree with him in every particular. The idea of persecuting the majority of hawks and owls systematically is simply preposterous, and any law which has for its object their indiscriminate destruction should be immediately repealed, since most of the birds alluded to are among the very best friends of the farmer. In regard to a few species, it is well worth while to suspend judgment until a thorough investigation as to their habits and food in your State can be carried out, for, as you are well aware, a species which in some parts of the country, and at some seasons, may be injurious, in other regions and under altered circumstances, may be chiefly beneficial.

I remain, yours sincerely,
LEONARD STEJNEGER,
Assist. Curator Dept. Birds, U. S. Nat. Mus.

Lucien M. Turner:

WASHINGTON, D. C., *March 3, 1886.*

B. H. WARREN, M. D., *Ornithologist Pennsylvania State Board of Agriculture, West Chester, Pa.:*

DEAR SIR: Your letter of recent date requesting my opinion of the act (No. 109) of the Commonwealth of Pennsylvania relative to the premiums paid for the destruction of certain species of birds and mammals, alleged to be injurious and classed as noxious within the meaning of that act, is at hand.

I must confess a surprise at the truly lamentable ignorance of the framer of that act in regard to the supposed noxious character of the hawks and owls, upon whose lives a premium has been set for their destruction.

It is well known that no more beneficial bird exists than the owl, whose nocturnal habits render it specially fitted to pursue the smaller rodents such as the mice, whose ravages upon the field, grain, root, and orchard are so well known that all farmers have from time immemorial exclaimed against the destructiveness of those quadrupeds, whose annual devastation causes the money value of the losses sustained through their ravages to swell into countless thousands of dollars.

The tender growths of the orchard are decorticated by the mice and rabbits, which are in turn devoured by the owls sought to be destroyed simply because some one desires to become notorious as a law-maker, and through utter ignorance of the subject, endeavors to deprive the farmer of his best nocturnal friends, which guard the growing crop with zealous care while the owner sleeps to regain a strength to enable him to continue the daily toil of protecting his crops from the devastation of his sleek-furred enemies, most assiduous at night. There is not a species of owl but that amply repays for the few incursions made at irregular periods upon isolated hen-roosts. Where a single fowl is thus lost, a thousand mice pay the penalty of their lives to the same owl.

The nocturnal habits of the owls render their services far more beneficial than may be accurately ascertained.

In regard to the hawks their reputation is much exaggerated so far as their injurious propensity is concerned, yet when truthful evidence is placed in the scales the beneficial services of the hawks will preponderate in a most satisfactory manner.

Certain species of the diurnal birds of prey are well known to feed almost exclusively upon small rodents, and in fact differing but little from the owls in regard to their food. Two or three species of hawks (those belonging to the genius *Archibuteo*) are notoriously the best diurnal mouse-catchers of all birds. Their habits to soar over the level tracts devoted to grasses and search for their food are so well known that further consideration of them is but repetition of established facts. The bolder species of hawks so rarely commit depredations upon the farm-yard fowls that these instances are, without doubt, the result of an individual predilection for which the entire family should not be branded. The number of rabbits and mice which the hawks annually destroy is simply incredible, as any really observant person must admit.

In my opinion, the destruction of the hawks and owls within the State of Pennsylvania will, ere many years, result in an incalculable injury to the farmer, who will be overrun with hordes of mice, which he will be powerless to limit, as their reproductiveness, when undisturbed, progresses with astonishing rapidity.

It would, in my opinion, be a wise measure to have the act relating to the alleged noxious birds totally repealed.

Very truly yours,
LUCIEN M. TURNER,
Smithsonian Institution, Washington, D. C.

Dr. Elliott Coues:

AMERICAN ORNITHOLOGICAL UNION,
OFFICE OF THE VICE-PRESIDENT,
WASHINGTON, D. C., *March 30. 1886.*

Dr. B. H. WARREN, *Ornithologist Pa. Board of Agriculture, West Chester, Pa.*:

DEAR SIR: Responding to your request of my opinion respecting the usefulness of hawks and owls, regarded from an agricultural or other economic stand-point, I beg to say that I consider these birds highly beneficial, and worthy of protective legislation. The numbers of poultry and of useful insectivorous birds which hawks and owls destroy is insignificant in comparison with the quantity of noxious rodents which they consume. Owls are particularly serviceable in this respect, and next after these come the buzzards.

Most birds of prey likewise consume enormous numbers of insects, among which are a large proportion of noxious kinds.

With respect,
Very truly yours,
ELLIOTT COUES,
Vice-pres't, A. O. U., etc.

Prof. S. F. Baird:

SMITHSONIAN INSTITUTION,
WASHINGTON, D. C., *April 10, 1882.*

DEAR SIR: The destruction of hawks will save an occasional fowl, but will cause a great increase in the abundance of field-mice, rabbits, snakes, frogs, &c., upon which hawks feed. It has now been conclusively shown, I think, that hawks perform an important function in maintaining in good condition the stock of game birds by capturing the weak and sickly, and thus preventing reproduction from unhealthy parents. One of the most plausible hypotheses explanatory of the occasional outbreaks of disease among the grouse of Scotland, has been the extermination of these correctives, the disease being most virulent where the game-keepers were most active in destroying what they considered vermin. It is my firm conviction that in the average of well-settled countries the hawks and owls are a benefit rather than the reverse to the community in general and the farmer in particular.

Very respectfully,
SPENCER F. BAIRD.

ATMOSPHERIC ELECTRICITY.

By Prof. I. THORNTON OSMOND, *State College, Pa., Meteorologist of the Board.*

The origin of atmospheric electricity is still a subject of investigation and discussion. Benjamin Franklin, in this State, proved the existence of electricity in the atmosphere at the time of thunder storms. It is now known that very considerable electric forces are constantly present in the atmosphere; that they are almost continually in a state of rapid variation, and that they are quite intimately connected with weather conditions and changes.

Thus atmospheric electricity has important relations to agriculture in two ways: Through its relation to weather (if not directly) affecting agricultural production, and by its violent action in thunder storms causing a considerable destruction of property and life.

First, *In Relation to Weather.*

Prof. T. C. Mendenhall, who has been for some time in charge of the electrical work of the scientific department of the United States Signal Service, has kindly prepared the following statement:

"The study of atmospheric electricity, and its relation to the other phenomena of weather, has received the attention of the Signal Office during the past two or three years. Several stations for observations have been established, and enough has already been done to justify the efforts made, and to give promise that the electric condition of the air may, in the future, contribute in no small degree to successful weather predictions.

The instruments in use in this work are, first, an electrometer, and second, what is technically known as the collector. [These are briefly described by Prof. Mendenhall.]

Undoubtedly, the first practical application of the knowledge obtained from the investigations in atmospheric electricity will be the predictions of showers and thunder storms, particularly severe local storms of sudden origin.

As an indicator of impending changes in the local weather, the electrometer promises to be of great value. The extreme sensitiveness of the apparatus, as at present used, renders it extremely susceptible to certain meteorological conditions, which, perhaps, would have no appreciable effect upon the usual meteorological instruments. Clouds passing over or in the immediate vicinity of the place of exposure of the collector, influence the character of the indication, and it may in time be possible in this way to obtain some record of cloudiness not dependent, as at present, on conditions of sunshine. Rainfall is also a condition influencing greatly the indications of the electrometer, and it seems but a question of time and study before the electrometer shall be used with a good measure of success as a means of foretelling rain. A large and rapid variation in the value of the potential, especially if indications of a negative character prevail, is almost certain to be followed or accompanied by rain.

The electrometer may also be used as a means of foretelling clearing weather. If, during a storm, the indications change from low positive and negative to steady high positive values, even if threatening weather prevails, it is highly probable that clearing weather will soon occur. Particularly, however, in the case of thunder-storms are the indications of the electrometer most decided, and the relationship of these indications to the storm features most clearly evidenced.

Naturally, a thunder-storm is a period of great electrical disturbance in the atmosphere, and it is the especial province of the electrometer to make evident disturbances of just this nature. A thunder-storm is always a period of great activity for the needle of the electrometer, and its fluctuations at this time are always very large and rapid. With every lightning flash the needle is agitated violently, apparently simultaneously with the flash; and in a case where the lightning is not seen, it is possible to ascertain the distance off of the flash by counting the seconds between the violent agitation of the needle and the sound of the thunder.

The subject is not at present sufficiently well understood to justify the use of the electrometer in predicting a considerable length of time in advance, but there is no reason apparent why, when a sufficient number of observing stations are established, curves of equal potentials, or curves of abnormal potentials, may not be daily charted on the synoptic weather map for use in the predictions of the general weather conditions."

Second, *Lightning Protection.*

1. The aggregate of property annually destroyed by lightning in this State is large, and there is a considerable loss of life. This is a needless waste.
2. Quite a large sum is paid for protection from lightning by rods.
3. The annual loss would be much greater but for this protection.
4. The protection is both needlessly expensive and inefficient.
5. There ought not to be a house, barn, factory, store, church, or any other building in the Commonwealth of Pennsylvania "struck" by lightning.

I have not at hand, if such exist, any reliable statistics of the annual loss. Nearly every neighborhood suffers some, and the total must be several hundreds of thousands of dollars, besides the lives lost.

Perhaps nobody but the lightning-rod companies could tell the annual cost of rods; unless these people are working for charity or in the face of starvation, it must be a pretty large sum.

Many people still question whether lightning-rods do afford protection, and others are doubtful whether the actual rods, in the condition that they are, afford more of protection or of danger. It is absolutely certain that good rods in good condition do protect from lightning. From the known laws of Nature, it could not be otherwise, and experience confirms the fact. No well-rodded building has ever been struck. Telegraph companies protect their poles from frequent destruction by lightning by occasional wires to earth along the lines. The British navy was losing more than fifty thousand pounds sterling annually before Sir William Snow Harris devised and applied his system of rodding the vessels, and stopped this destruction of property and life. But it is useless to argue further that a good lightning conductor does protect; every one at all informed on the subject admits this. The question is whether the actual rods, on the whole, protect or endanger more. In the absence of more definite information there is room, perhaps, for difference of opinion on this point. Yet, observation appears to indicate that of closely similar buildings in closely corresponding situations, the per cent. injured by lightning is much greater among the unrodded. Every instance of a rodded building injured or destroyed by lightning (and such instances are much too numerous) is an example of money spent for a poorly constructed, applied, or maintained, and, therefore, inefficient, system of lightning protection. And usually the money thus wasted was about double the amount that a good and efficient system of protection would have cost.

The English and the French governments have several times appointed, as have other governments, commissions of the ablest scientific men to consider the whole subject and every detail of lightning protection. The latest report, and of the highest scientific authority, is one published in 1882 by a body of men not under government appointment. This conference, called by the Meteorological Society of England, consisted of three members of this society, two members of the Royal Institute of British Architects, two of the Society of Telegraph Engineers and of Electricians, two of the Physical Society, and two noted electricians, Professors Ayrton and Hughes. This very able body held a number of meetings, from November, 1878, to May, 1882, the members doing much work in the intervals. They sent circulars, asking for information, to sixty-five manufacturers of lightning conductors, to all the members of the Royal Institute of British Architects throughout the kingdom, and to a large number of the most important newspapers and periodicals, made abstracts of sixty English and foreign treatises on lightning conductors, and consulted the official instructions issued by a number of governments. From these and other sources they obtained the greatest mass of information on lightning and lightning conductors ever collected, and embodied much of it, well digested, in their report in 1882.

The following is a summary from their report of *Rules for the Erection of Lightning Conductors:*

Points.—The upper end of the rod should not be sharper than a cone whose height equals the radius of the base. (Long, fine points are sometimes melted, setting the roof on fire by drops of hot metal.) A foot lower down, fix a ring bearing three or four sharp points six inches long, platinized or nickle-plated to resist oxidation. (Points greatly facilitate the constant silent discharge of electricity.)

Upper Terminals.—The number of points or conductors required cannot be stated in a general rule. There is no well authenticated instance of a building being struck within a conical space, the radius of whose base was equal to the height of the rod above the building. Every chimney should have a terminal connected to the nearest rod, on account of the conducting power of heated air and of soot.

Insulators.—The rod is not to be kept from the building by glass or other insulators, but attached to it by fastenings of the same metal as the rod. (The evidence against insulation is overwhelming; it is unnecessary and mischievous.)

Position.—It is better to take the rod down the side of the building most exposed to rain. The fastenings should not compress or distort the rod, or prevent contraction or expansion, and yet should hold it firmly.

Metallic Masses, Pipes, etc.—All vanes, finials, ridges, iron-work, &c., should be connected with the conductor; also any extensive masses of metal, such as beams, girders, pipes, hot-water systems, &c., internal or external, should be electrically connected to the earth or to the conductor. But the conductor should be kept away from soft metal pipes and from all internal gas pipes.

Material.—Copper, of conductivity not less than 90 per cent. of that of pure copper, and weighing not less than six ounces per foot of length, in the form of either tape or rope made of wires, not less than No. 12 B. W. G. Iron strap or rod, weighing not less than two and one half pounds per foot, may be used.

Joints.—Every joint, beside being well cleaned, screwed, scarfed, or riveted, should be thoroughly soldered. (Electrically, bad joints are the most fruitful source of danger in rods, and may make conductors worse than useless.)

Curvature.—The rod should not be bent abruptly around sharp corners. In no case should the length of the rod between two points be more than once and a half as long as the straight line between the points. (A very sharp turn is nearly the same as a point, and may cause the electricity to leave the conductor.)

Earth Connection.—It is essential that the lower end of the conductor be buried in a permanently damp soil. For an iron rod a galvanized iron plate, of not less than eighteen square feet of surface, buried in permanently wet earth and surrounded by cinders or coke, should be used, soldering the rod to it. For a copper conductor, the plate should be a sheet of same size, three feet by three feet, and one sixteenth of an inch thick, buried in same manner. If a gas or water *main* (not a mere lead pipe) is near, the conductor may be soldered to it. It is well to attach to a main, where practicable, and also to a plate.

Painting.—Iron rods should be painted, even if galvanized; with copper rods it is indifferent.

The practice of insulation, condemned in the above rules, arose out of ignorance and is perpetuated by ignorance, custom, and the interest of dealers. In a thunder storm, the surface of the earth (and whatever objects are on it) is either positively or negatively electrified and the clouds above are oppositely electrified. The electrification is much the greatest upon elevated and more or less pointed objects, like buildings. These opposite conditions tend to equilibrium by what is called a "discharge" of electricity (stroke of lightning) through the intervening air. This discharge will follow the easiest path, the best conductor of electricity. The purpose of a lightning conductor is, first, to drain the electricity out of a building continually, and quietly pour it into the air or the earth, preventing any great accumulation of it upon the building; but, second, if such an accumulation does occur as to cause a suddden and violent discharge to the clouds, the conductor is to form so much easier a path than the building that the electricity will not go through the latter. To insulate conductors, then, is as foolish and mischievous as it would be to obstruct, block up, or in any way increase the resistance to flow in pipes for the discharge of a liquid. Fortunately, the common insulators have but little effect. But whatever effect they have is injurious. Straps of the same metal as the conductor (to prevent "corrosion" by galvanic action when wet) bent so as just to fit the conductor and screwed fast to the building should always be used.

It will be noticed that the rules specify the weight per foot; not the external circumference, or amount of surface. It is not important what the amount of surface is, but what *cross-section of metal* the conductor has. If the latter is insufficient, the conductor will melt off, whatever its surface may be. Fluting, twisting, and such devices to increase surface are worthless, or worse. There is, probably, some advantage in having a conductor in the form of a moderately thin, flat strip, rather than in a round or square rod of the same weight per foot.

Personal supervision should be exercised when a building is being rodded to see that all the work is well done, and especially to see that the *earth connection is properly made.*

Lightning-rods not known to have been properly erected should be tested, electrically, to determine the conductivity of the rod and the resistance of the earth connection. This is easily done.

Beside the *Report of the Lightning Rod Conference*, quoted from above, consult *A Practical Treatise on Lightning Conductors*, by H. W. Spang; *Lightning Rods*, by John Phin; *Lightning Conductors. their History, Nature, and Mode of Application*, Anderson. The little work by Phin is the cheapest, (50 cents,) very practical and quite reliable; Spang's is good also. The others are of higher authority, and also of higher price. A list of one hundred and four works upon lightning conductors and closely connected subjects was made by the conference.

HISTORY AND PRESENT CONDITION OF FRUIT-GROWING IN PENNSYLVANIA.

By E. SATTERTHWAITE, *Jenkintown, Pa., Pomologist of the Board.*

The subject of fruits and their culture naturally presents itself in two aspects: their culture for home use, and the business of growing them for market. The first branch of the subject is one that has engaged the attention of man from the earliest dawn of civilization, and can never lose its interest, no matter what may happen to affect other pursuits. No changes of fashions, or new discoveries, or inventions that are continually revolutionizing other pursuits can take away the interest in this subject, which is a natural instinct in every well-regulated mind. The other branch of our subject, though not of such universal interest, is, perhaps, of no less importance, as the number more or less dependent on it as a means of livelihood is very large, and in the present depressed condition of many other industries, numbers are turning their attention in that direction, as I find from the very frequent inquiries that I receive from those seeking information on the subject. And as such great and rapid changes have taken place, and are still in progress, vitally affecting this pursuit, it will, perhaps, be well to take a retrospective glance at the past history of the business, which may assist us in arriving at a more correct judgment as to its present condition and future prospects. To do this will not require us to go back so very far; within the memory of many that are still living, the business of growing fruit for market in this country was very insignificant compared with the present time. Before the advent of steam transportation, this business was necessarily confined to the close vicinity of the few market towns of that period, and was hardly recognized as a business. Though the markets in those days were not supplied with the uninterrupted abundance and infinite variety that they are at present, it must not be supposed that there was not plenty of fruit, and good fruit, too. It is not only the revolution brought about by the facilities for cheap and rapid transportation; there have been other causes, some of which are hard to understand, that have seriously affected this business. Though vast efforts have been made within the recent past, and much progress has been made in the art and science of fruit-culture, it must be confessed that in some very important matters we have retrograded. It is a fact that will not be disputed, that from the first settlement of this country up to a period dating back about half a century, many of our most valuable fruits, which can now only be grown at all with great difficulty, and are at best an unreliable and unsatisfactory crop, grew and yielded bountifully with but little care and attention. This we can account for partly, but not entirely, by the many new insect enemies which have since made their appearance. We all know from tradition, and some of us from faint recollection of early boyhood days, of the magnificent apples for which the section of country surrounding Philadelphia was famous. Indeed, it was no trouble then to grow apples, and though the number of varieties under cultivation has since been increased, perhaps a hundred-fold, there certainly are none better, if as good, as the old Bellflowers, Seek-no-furthers, and Newtown Pippins in winter, and in summer, the Bough and Maiden's Blush and luscious Pearmains. These, and many others as good, which now can barely be coaxed into bearing a few mean and imperfect specimens, were then an almost certain and abundant crop. And what was true of apples, was also true of peaches, plums, and cherries. The decadence of the apple crop can be traced largely to the codling moth. Yet it would seem to be attaching almost too much importance to this insignificant insect to ascribe it all to that. And yet there is no other cause that we are able to explain.

The almost total destruction of peaches in this State was brought about, at a rather earlier date, by the advent of the disease known as the "yellows," which, in a short time, destroyed about all the peach trees, and for a long time put a stop almost entirely to their culture in this State. At the time of which I have been speaking, the curculio had not yet made its appearance, and it was no trouble to grow plums. Cherries, too, for some reason not easily explained, were a far more satisfactory crop than at present, being not near so subject to rot. And with all the addition to the number of varieties, we are obliged to confess that there has been no improvement in any respect in any of the fruits that I have named. This, however, is not the case with all fruits; with pears, grapes, strawberries, and some others, great progress has been made, both in improved varieties and in modes of culture.

Before the advent of steam transportation, what fruit was marketed was mostly hauled in wagons. Within my memory, the Philadelphia market was supplied in that way. Apples were carried in bags like potatoes, or, what was common with them as well as peaches, was to load them in bulk, and measure them out to customers by the bushel or peck. Strawberries and other small fruits, which are now grown for market by the thousands of acres, were then scarcely known as a market crop. Such fruits as there were—apples, peaches, plums, and cherries—were generally so abundant in their season, and cheap, that their culture, as a business, was scarcely thought of at that time. But there came a change; first, the peach would no longer thrive. The mysterious "yellows" swept them all out of existence in this latitude, and for a time they were almost unknown in our markets. It was not very long, however, before the wide-awake residents of the more favored clime of the region bordering on the shores of the Delaware and Chesapeake bays made the discovery that they could grow peaches there without limit, and as steam navigation had then made its advent, peach-growing in that country soon grew into a very large and lucrative business, and this, perhaps, was about the first development of fruit-growing into an important industry in this country.

The decadence in the apple crop followed not long after that of peaches in this State, and it soon came about that apples, from being almost a nuisance to the farmer, began to grow quite scarce.

This may have resulted partly from neglect, their superabundance and cheapness having brought them into disfavor with farmers as an unprofitable crop. But when the time again came that apples were in demand, it was discovered that they would no longer grow as formerly. A profusion of fruit had been productive of a profusion of insects, and from this cause, and partly, perhaps, from the running out of many good old sorts, a great change had taken place.

About this time the tree peddler made his appearance, and soon did a thriving business. But, unfortunately, the most of the apple trees that he sold were of varieties not at all adapted to this latitude, and though good enough in northern New York, where most of them came from, were of no account here, the winter varieties all ripening early in the fall, when few apples are wanted.

The apple-tree borer too had then come, and played havoc with many young orchards. And from all these causes it has happened that for the last thirty or forty years apple-culture has not prospered here, and the markets of Pennsylvania have been largely supplied from other States. The facilities for cheap and rapid transportation which have in the meantime grown up, have afforded the means of doing this.

It would be beyond the scope of the present article, and would require much more time than could be allowed me, to go into a discussion of the many questions involved in this subject as to why apples do not grow and thrive here as once they did, and as to whether or not we could and ought to grow all we need and some to spare in this State. That very important and interesting question would be a prolific topic for an essay of itself. I will try to confine myself to what I set out to do, to give a very brief history of what has been done in fruit-culture here.

What the codling moth was to the apple, the curculio, which appeared about the same time, was to the plum, and since then our markets have been mostly supplied with that fruit from distant parts.

I have enumerated some of the causes which have been at work in effecting the changes and perplexities connected with this business, but the one more potent than all I have only hinted at. The growth of cheap and rapid transportation, and instantaneous communication with the whole habitable world, have, within a very few years, brought to the fruit-grower the competition of all the most favored spots, wherever situated. With my first acquaintance with the business, some forty years since, the fruit-grower and market-gardener could take in within a very small circle the scope of the competition in his particular market, and lay his plans accordingly. If, by superior skill and enterprise and industry, he could produce a superior article, or have it ready for market earlier than his neighbors, he was sure of a remunerative price. But all that is totally changed now. No matter what he may grow, or how early, or how late he may have it, he is sure to find the market glutted from some more favored spot. Instead of having to compete with a very limited district, and with others situated under like conditions with himself, he finds himself competing with a whole continent. The New Jersey trucker, for instance, who, a few years ago found a sure profit in his early tomatoes, peas, cucumbers, and strawberries, and many other fruits and vegetables, finds the market glutted with all these things before he can begin to plant, and even in his cabbage crop, cheap as that was, he has a competitor now in Germany, from where sauer kraut and cabbages are now brought by the ship load. Any one would have been thought out of his mind who would have told us forty years ago that, in a few years, our markets in the East would be supplied with green fruits from the Pacific coast, with pears, plums, apricots, and even cherries from California; strawberries, peas, and asparagus in January from Florida; with apples from Missouri and potatoes from Wisconsin; yet all this and worse has come to pass. The markets of the East are now supplied with celery from Michigan, where, I suppose, somebody has found a spot with a soil and climate just suited to this crop, and is growing it by the thousands of acres and supplying all the markets in the country with it, cheaper than our market gardeners can afford to grow it. And so it is with everything; so wide-awake have dealers in these things become that the whole world is ransacked to find the most favorable spots for the growing of anything that will sell, and there it will be grown. Distance from market counts for but little now, as it costs no more for transportation for one thousand miles than for ten. I do not speak of these things as something to be complained of, or as a subject of regret. As a part of the great labor-saving improvements of the age, they should be for the common benefit. I mention them only as an important factor to be considered in connection with the subject, and one of most vital importance to those who follow this pursuit for a livelihood, or who contemplate doing so.

It would be a much pleasanter task for me if I could treat this subject as the practice formerly was, by its professed teachers, by proceeding to tell what and how to plant, and how to care for and market the crop, and figure up the munificent profits to follow. The question now of most importance would seem to be, not what to plant, but whether it will pay to plant at all. And certain it is that he who lays his plans without giving due weight to the considerations here suggested, will make a big mistake.

The foregoing remarks are, of course, only intended to apply to that branch of my subject pertaining to the growing of fruits for market. I thought it proper to say this much in answer to many inquiries on the subject. They have no reference to the question of growing fruits for home use. This is always in order, and can always be made to pay, and I cannot too strongly recommend to every one who has so much as a garden to grow their own fruits, and especially does this apply to the farmer. No farmer should be without a truck garden of ample dimensions for supplying his family with all the fruits and vegetables they can consume, because no matter how cheap and abundant they may be in the market, they can never be obtained as fresh and wholesome as from one's own grounds. And even on the score of cheapness, where a market happens to be convenient, it is better for the farmer to grow his own. It must not be supposed that because the producer has to be satisfied with very low prices for his produce, it can be bought at retail in the market so very low. Most commonly there are several big profits added to the price between the producer and the consumer. The idea always seemed to me to be monstrous to see a farmer buy strawberries in the market, already past the stage of wholesomeness, and take them home for his family, and yet this is quite customary.

There is another thing to be considered, in this connection, of the most vital importance. There is nothing that adds more to the attractions of a country home than plenty of fruit, and this is one of the things that no farmer should, for a moment, lose sight of that no matter how other things may go, he has it in his power to make for himself a comfortable and attractive home.

I had intended to describe how such a fruit-garden should be made, as I think every farm should have, but I find I cannot do this but very briefly, without trespassing too long on your time. I will only say, that in my experience I have found that horse-culture on the farm is in every way preferable to spade or hand-culture, and on this account there should be on every farm, from a half acre to an acre or more, set apart for a fruit and truck garden. And on such a plot, cultivated with the plow and by horse-culture, an abundance of fruit and vegetables could always be obtained, with less labor than is commonly given to the small kitchen garden, producing a very meager supply. The ground for this purpose should be carefully selected, it should be of good fertility, nearly level, neither wet nor very stony. If the plot is small it should be rectangular in shape rather than square, with the rows running lengthwise to facilitate the use of the plow. Its contiguity to the house is a matter of importance, but should not be determined without considering the liability of damage from the fowls. On this account I should prefer it a little ways removed, and then it need not be fenced against poultry. There are always plenty of fruit and nut-bearing trees not suitable for planting in the garden that can be planted around the house and farm-yard, and on the lawn. When the ground for the garden has been prepared, as would be proper for a crop of wheat or corn, it should be planted first, with fruit trees in rows of a good width apart. They may be closer in the row. Currants, gooseberries, raspberries, and rhubarb can be planted in the rows between the trees. If apple trees are included in the garden, it should be larger, and all the apple trees should be planted on one side, so that when they get too large to grow other things amongst them, they can be left to themselves. The ground can then be planted with all kinds of garden truck in rows, so that the whole can be worked with the horse cultivator. There is not the least difficulty in working such a garden with the plow and cultivator, without doing the least injury to the trees, as I know from long experience with fifty acres of such a garden. One land, that is the space between two of the tree rows, had better be set apart for such things as occupy the ground permanently. In this there might be a row of grapes, one of blackberries, and a row or two of asparagus. I cannot now do anything more than give this general outline of what a farm garden should be. To go into the subject further and undertake to tell what kinds of fruit and what varieties to plant, and how to care for them, would be to enter a field of discussion that would occupy as much time as I have already taken, and I fear that I have now exceeded my limits. And I will just say in conclusion that I feel that I cannot too strongly urge upon farmers the importance of keeping in view what I have before suggested—the surrounding of their homes with everything that can make a country home attractive, I mean so far as this can be done without any extravagant outlay, which is not to be thought of where the farm is to afford the means of livelihood. But very much can be done in this direction without incurring any expense, and in the matter of planting and caring for fruit, within a reasonable limit, there is nothing that the farmer can do that will pay him better. This and the thousand other little things that can be done to make the home a pleasant and attractive spot, with no expense but a little labor and attention at times when more important matters are not pressing, will go far in solving the problem of "How can we make our farms pay better?" and also that other equally important one, "How can we teach our children to be contented with farm life?" and on this I believe the future of our country greatly depends. For it is in the country and on the farm, and there only, if at all, are to be grown the men and women who can carry us safely through the perils that unquestionably are threatening us, and make of our government what it should be, not only the greatest, the most prosperous and powerful on earth, but what is of far more importance, a country of pleasant, comfortable, attractive, and contented homes.

NOTES ON FRUIT CULTURE.

By the Secretary.

In the discussions which, at the meetings of the Board, have followed the reading of essays upon topics relating to fruit-culture, the following have been among the points most prominently brought out:

We have made a serious error in purchasing so many of our apple trees from points further north, and in selecting varieties which have and are doing well in more northern locations. First, By obtaining trees from northern points we find that they carry their season with them, and that the Baldwin and Fallawater, which are winter apples further north, are with us but early fall fruit, and that they are with great difficulty kept for any length of time. Will not some one of our prominent nurserymen try the experiment of selecting and carefully propagating some good variety of southern apple, such as may be found in North Carolina or Southern Virginia, and note the result? We think it will be found that grafts either from the north or south will, to a certain extent, carry the season with them, and if from the south, the fruit will hang on longer in our orchards than it does from northern trees, or from Pennsylvania trees from northern buds. It is at least worthy of a trial, for many of our orchards, owing to the selection alluded to, are comparatively worthless as a source of profit.

Has any one made a careful experiment in order to ascertain the result of annual applications of potash or other commercial salts to our orchards? Many of our writers claim that many of the diseases to which our fruit trees are now liable, are the result, not of direct diseases, but of an impoverished soil, possibly not impoverished in all of the essential elements, but in one or more. Many have assumed that the element wanting is potash; if so, why will it not pay to apply soluble salts of potash and soda at regular intervals? if applied to the surface they will soon dissolve and work into the soil. In all such applications spread the fertilizer over the whole surface and not, as is too often done, immediately around the trunk; fertilize the whole ground, and sooner or later the roots will find it. It must be remembered that each year the fine rootlets at or near the end of the main roots, die and are replaced by others which are a little further from the trunk, and thus the tree year by year extends its roots into new soil and new food supplies.

In the growth of grapes, it will be found that much of the conflicting testimony which we have, even from practical men, is due to variations in soil and position. One tells us that the Catawba has run out; another, that it is the best grape that he can grow; another, that it is ruined by mildew; another, that it is remarkably free from disease, but that it runs too much to leaf and vine and too little to fruit. All of these statements are no doubt true and could be readily reconciled if we were in possession of all of the facts in each case. When we hear of any one being successful with the Catawba we are tempted to ask if he does not grow his vines against a wall or a high trellis. If he claims that they are free from mildew we are tempted to ask the same question; if they run to leaf and vine we suspect that potash is deficient in his soil and that vegetable matter (decayed) exists in considerable amounts; differences of soil and situation work much greater changes in the yield and quality of grapes that we often imagine. We often err in judging before all of the evidence is in and before we can possibly arrive at an intelligent and rational decision.

The great diversity of opinion as to the cause of blight in pears is much of it reconciled when we bear in mind that there are at least two distinct kinds of blight, and that they are often confounded in our public discussions, one speaker referring to leaf blight and another to that which primarily affects the bark. They may not be subject to the same rules, and of course cannot be reached by the same remedy. Fire-blight, so far as we know, has at present no remedy; all the plans which from time to time have been so strongly recommended fail with a majority of growers. That it is contagious, hardly admits of a doubt. That, like other contagious diseases, it may be controlled and prevented (in its worst effects) by inoculation, seems quite probable. Experiments are yet wanting to prove the entire success of inoculation, but enough has been ascertained to warrant careful experiments in this line. If we can by inoculation give the tree the disease in a mild form, and if this gives it immunity from a second attack (as is claimed), we certainly have made a step forward and in the proper direction.

At one of the meetings of the Board, a practical fruit-grower present claimed that he could secure immunity from the borer in quince trees by working the graft upon the white thorn, and thus securing a borer-proof collar which would enable him to produce perfect quinces. He also claimed that this plan gave him a much greater range of soil, for his white thorn quinces would thrive upon soils where the ordinary tree would utterly fail and eventually die. That he could secure perfect fruit in this way and avoid nine tenths of the drawbacks from disease is an important item in the culture of this fruit.

ROADS AND ROAD LAWS.

A NEW ROAD LAW.

By Rev. W. L. BULL, *Whitford*, *Chester county*, *Penna.*

[Presented at the Annual Meeting.]

I was much pleased to see in the Philadelphia *Press* of June 30 an editorial headed "Country Roads," from which I quote the following: "The dirt shoveled upon the country roads by the supervisor's directions has been washed away by recent rains. This happens with great regularity every spring. While the present system of road-making is continued, the bad roads are likely to continue. We go on, year in and year out, like the spiders which spin webs within reach of the house-keeper's broom, throwing loose dirt on the roads, only to see it washed away inside of a few weeks, and for the rest of the year repairs are made to vehicles, harness, and horse-flesh. * * * * The counties need improved roads more than Philadelphia needs better streets." A comparison, by the way, to any one familiar with the condition of the latter, as uncomplimentary, and a criticism as severe, if deserved, as could well be imagined.

The writer hears almost daily complaints regarding them, which are usually laid at the supervisor's door, on the ground of his unfaithfulness or ignorance.

Whether these accusations be just or not, there must be something radically wrong when so little, if any, improvement is made from year to year, even in a day when road machines are so common and traveling in light vehicles so greatly on the increase, and the supervisor owes it to himself for his own vindication, as well as the township he represents, to put forth every effort to have some means adopted by which the taxpayers shall be convinced that he is doing his duty, and that they shall be repaid the taxes they are annually mulcted for the maintenance of good roads.

While not, by any means, disposed to lay the entire blame upon the supervisor, so long as he receives so little encouragement from the too-often unwilling taxpayer, who is so ready to grumble when called upon to assist in repairing the roads, I am convinced that their bad condition is due less to a lack of funds than the lack of wise, efficient, and combined action on the part of supervisors, and that if each of these officers did his whole duty there would be much less cause for complaint.

There are, however, three or four reasons why the supervisor, as such, is likely to be a failure, and the office the most difficult of all township offices to fill.

In the first place, he, like other men, is fond of popularity, and to enforce the road laws during certain seasons of the year, requires no little amount of moral courage, and is often done at the risk of offending a friend or neighbor, who regards his obligations to mend roads as a necessary evil rather than a benefit to himself and the pnblic, as well as endangering his chance for a vote in the future.

Besides, he is usually engaged in some other pursuit, as a farmer or mechanic, and thus, very naturally devoting his first attention to his private affairs, comes to consider his public duties as matters of secondary importance.

Again, the remuneration received by him is so small as to offer but a slight inducement to him to be faithful in the discharge of his duties.

Lastly, even if he is sincerely desirous to fulfill his obligations, he oftentimes displays a lamentable degree of ignorance as to the plainest principles of road-building; plowing a furrow on each side of the road a little, if any, lower than the road-bed itself, and throwing the loose stones and unbroken sod into the middle of the road, to be broken up by the casual passer-by, at the imminent risk of snapping a spring or laming a horse, cannot be called, by any sort of euphemism, either road-mending or road-making.

I know all this is wrong. Men ought to be morally courageous, unselfish, faithful, and intelligent; but human nature, and not in the least the supervisor's nature, being what it is, it seems to me that the only way to obviate these difficulties is to abolish the present system of so-called road-making altogether, whether, as in my own township, we sell out the roads in half-mile sections, for a period of three years, to the lowest bidder, or, as under the old plan, make the supervisor solely responsible, obliging him, however, to give the taxpayers opportunity to work out their taxes, a plan, "the main object of which," it has been wittily said, "seems to be to occupy as much time as possible in doing the least possible work."

Instead of it, I offer the following suggestions:

While retaining the office of supervisor, as required by law, reduce their number to two, and restrict their duties to laying and collecting the road tax; to the appointment of a township road agent; to the payment of his salary and the wages of his employés, and to a general oversight of the roads, they being required, at least once in every month, personally to inspect the roads of their township.

Secondly. Create the office of road agent or commissioner, to be filled by the supervisor's appointment, to whom alone he shall be responsible, and by no means made elective, who, for a fixed salary, shall repair and keep the roads in proper order; empowering him, for that purpose, to hire a certain number of men, horses, and carts annually.

Thirdly. Oblige each township to purchase a road-scraper and iron roller, to be kept in repair at public expense; and although it may be premature in the present state of our finances to demand that the townships shall possess a portable stone-crusher, yet the time is not far distant, I trust, when they will be generally introduced, and a gradual but permanent system of macadamized roads be established.

To render my ideas more intelligible, I place in tabulated form what is embodied in the foregoing suggestions, taking as a standard for the number necessary to be employed the township of which I am a resident—West Whiteland, Chester county—covering an area about four miles square, and containing more than forty miles of roads, with an average road tax for the last four years of sixteen hundred dollars:

Salary of road agent, ...	$600 00
Wages of four men for 180 days, at $1 25 per diem, ...	900 00
Hire of four horses necessary for road machine, for 50 days, at $1 25 per horse, ...	250 00
Hire of two horses and carts, for 130 days, at $1 25 per horse and cart, ...	325 00

Wages of two supervisors for 12 days' inspection, at $2 per diem,	$48 00
Supervisors' 5 per cent. commission for collecting road tax,	80 00
	$2,203 00

To which amount, for the first year of the proposed change, must be added:

Cost of road-scraper,	$150 00
Cost of iron roller,	75 00
	$225 00

If objections should be made to this, or any similar plan, on the ground of the increase in taxes necessary to carry it out, admitting that no improvement of any kind can be effected without the expenditure of money, I am informed, by competent authorities, that, after the roads are once put in order, they can be maintained at a reduction of two thirds their present cost; while the increase in the value of land, the decrease in the wear and tear of both horses and wagons, and the additional facilities afforded for transportation, would, in a few years, more than offset such additional expenses.

There still remains, however, another source of revenue, which, to my surprise, I have never seen referred to in any article bearing upon this subject.

There is a class of men in every community who make a business of hauling, to whom the very existence of the roads is an indispensable condition of success. Such persons, under our present system, should certainly pay a much larger proportion of tax than the ordinary citizen, who uses the roads merely as a means of transit.

For example, in a certain township there are two individuals engaged in the transportation of sand; another, of lime and gravel; a fourth, of lime and coal; a fifth, of timber; and two others, of coal, lumber, ice, grain, and freight.

I do not hesitate to say that the seven or eight teams engaged almost daily in this work do more, especially in the spring and after a heavy rain, to cut up and damage the roads in one day than four or five times as many carriages or wagons, such as every farmer possesses, would do in a week.

Ought not, therefore, as a matter of simple justice, the owners of such teams to be taxed much more proportionally than one like myself, whose heaviest vehicle is a one-horse cart?

If a basis be wanted upon which to adjust such additional tax, the capacity or tonnage of the vehicle and the number of horses or mules required to draw it would, perhaps, offer the fairest.

The suggestions I have offered, it will be observed, are not radical in their nature, and possess the merit, I think, of being practical in their application and easily carried out with some modifications in our present road laws.

My experience in this matter with the last Legislature convinces me of the impossibility of effecting any serious alteration at this time.

However, to make our roads what they should be, I am convinced that a much more radical change is needed, the necessity of which, as our ultimate aim, we must strive to impress upon the taxpayers of the State. This change, I believe, can be effected only by placing all main thoroughfares under the supervision of State and county officers to be turnpiked, while the shorter roads, or those beginning and ending in a single township, or extending through two or three contiguous ones, with a maximum limit as to length, might be maintained dirt roads as heretofore.

To meet the increased expenditure such a system would necessarily entail, and the assertion "it should be pretty well proved by this time that townships are unable of themselves to maintain good highways," be admitted as true, application could be made to the Legislature for an annual appropriation to be distributed like the school fund, on condition that such township collects a road tax at least equal in amount to the sum it would receive from the State.

This plan has, at least, the merit of reducing the tax upon real estate, which falls so heavily upon the farmer, by making personal property liable for its share of the burden.

I am well aware that the subject presents many problems to solve, not the least being the passage of a law that shall satisfy the needs of the more densely populated counties, and at the same time not increase the burdens of those more sparsely settled.

The most satisfactory solution of the difficulty I have met with is to be found in the provisions of the new road bill introduced at the last session of the Legislature by Senator J. P. S. Gobin, of Lebanon, which, with its local option feature, deserves careful study, and ought to modify the objections as to expense urged by many of the poorer counties.

Let us then, after an intelligent discussion of the matter, do what we can to impress upon the minds of our legislators the importance and necessity of effecting a change in our present antiquated system of road laws, so that at the next session of the Legislature the agitation of many years may result in wise and fruitful action, and the present disgraceful condition of the roads be exchanged for one of safety, durability, comfort, and beauty.

At different periods during the existence of the Board, the question of roads and road laws has been considered, essays have been read and discussed, and the question in all its bearings has had the attention of the Board. At a recent meeting, the following draft of a road law was presented by the special committee on road laws, and we append a condensation of the discussion which followed the reading of the law.

On behalf of the committee, Hon. C. C. MUSSELMAN, of Somerset, presented the following:

A SUPPLEMENT

To an act entitled "An act relating to roads, highways, and bridges," approved the 13th day of June, A. D. 1836.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same,* That on or before the second Monday of March of each year, the supervisors or road commissioners of the several townships of this Commonwealth shall meet and determine the amount of road tax that they deem necessary to make, build, and put in good repair the several roads and bridges of their respective townships and boroughs for the current year, which amount shall not exceed seven mills on every dollar of valuation so made, including one dollar in cash, or one day's work, which every male taxable in this Commonwealth over twenty-one years of age shall pay or work, or cause to be worked; and when the seven mills levied have been duly expended, and said roads are not in good condition and repair, and the amount first levied shall not be deemed sufficient to make the necessary repairs, the said supervisors, street or road commissioners may levy an additional tax not exceeding three mills on every dollar of valuation.

SECTION 2. It shall be lawful for supervisors, road or street commissioners, or either of them, to collect one fourth of all taxes on their duplicates in cash, if deemed necessary or best by them or either of them.

SECTION 3. The supervisors, road or street commissioners, or either of them, shall have power to purchase and procure, for the use of their respective townships, boroughs or districts, such materials, tools, implements, and machinery, and employ such laborers and mechanics, as they may deem necessary and best, at fair prices and fair wages, to use or work on their respective roads, culverts, or bridges in their respective townships or boroughs. And it shall be the duty of supervisors, road or street commissioners, to keep all tools, implements, and machinery belonging to their respective districts in their care, and surrender them to their successors in office in good condition.

SECTION 4. It shall be the duty of the supervisors, road or street commissioners, or either of them, to keep all the roads and bridges within their respective townships or boroughs in good and substantial repair; the bed of the road not to be less than fourteen feet wide, raised in the middle, unless impracticable, and sloped gradually to the sides, where ditches or drains shall be kept open of sufficient depth and width to carry off water; to keep all loose stones from the roads, and to make and repair all roads as far as practicable during the spring and summer seasons. And further, the supervisors of townships or boroughs, where a bridge is or has been built by the county commissioners, shall fill up between the wings of the abutments and the ends of the bridge, and gradually sloping back, making the grade in no case to exceed five degrees from the floor of the bridge.

SECTION 5. Nothing in this act shall be so construed as to prevent supervisors, road or street commissioners, or either of them, from letting or giving out by contract the making and repairing of roads or any parts of roads, culverts, or bridges within their respective townships, or boroughs, or districts, if by them, or either of them, deemed best for the public good, subject to the foregoing provisions of this act: *Provided, however*, That nothing in this act shall be so construed as to relieve supervisors, road or street commissioners, or either of them, from their responsibility for the making and keeping in good repair such roads or parts of roads so let by contract.

SECTION 6. All laws or parts of laws inconsistent with the provisions of this act are hereby repealed: *Provided*, That nothing in this act shall be deemed or taken to repeal any special or local act now in force relating to roads or bridges in any of the counties, townships, or boroughs in this Commonwealth.

This act presented to the Board by its committee, is a modification of the act of 1856, applying especially to Crawford county, which provides as follows:

"SECTION 1. That the supervisors of the several townships in the county of Crawford be and are hereby authorized to assess and collect a tax for road and bridge purposes, such as they may deem necessary, said tax not to exceed one per centum on the dollar of valuation, and if the said supervisors shall deem it necessary, they may collect a part of the tax so assessed in money: *Provided*, That the part so assessed shall not, in any one year, exceed three mills on each dollar of valuation."

The act of 1854, applying to the same county, provides as follows:

"SECTION 4. That the supervisors shall lay such tax on the property so assessed as they may deem necessary for road and bridge purposes for the current year, not exceeding one half per cent. on every dollar of valuation so made; but if the same shall be all expended, and unavoidable repairs shall be required, the supervisors may raise an additional sum for that purpose, not exceeding one per cent. in any one year in the whole, and no taxable shall be assessed with less than one day's work per year, and if the supervisors find it necessary, they may each year collect a part of the tax, not exceeding ten per cent. thereof in money, and no supervisor or road-master shall hereafter create any debt against the township by working more than the amount of his duplicate and assessment on the roads, without the consent of township auditors first had and obtained."

In presenting the proposed act for the committee, Hon. C. C. MUSSELMAN explained its features as follows:

Mr. President: As chairman of the committee, perhaps it would be proper for me to make a short statement before I read this report. About six months ago, at our meeting at Lock Haven, we discussed the road law, and the associate editor of *The Farm Journal* made the present road law and the manner of working out the road tax so ridiculous that we thought we ought to do something towards bettering the present laws. The member from Blair made a motion to have a committee of five appointed, and insisted on my being the chairman. We have been laboring now half a year; we were to report upon a revision of the existing general road laws at a meeting held at Bedford, which we did. We had a bill there of twenty-two sections, which was read and discussed. We found, by that discussion, that one man would like to have in the bill that which another did not want; and there were some suggestions made to be inserted. The report was referred back to the committee. Now, we, the committee, have thought proper to simmer it down and do the best we can in order to have something that we can present. We have here a draft of an act with but six sections, which is supplemental to the old act. It supplies an immediate want; and in order to have something that we can agree upon and have a chance of having passed by the Legislature, we have this report to make, which has been agreed upon. I would like to say, before I read it, that this bill is in the hands of the legislative Committee on Counties and Townships. I was advised by a friend of this bill to have it reported, so that it may get on the calendar; and that whatever amendments, if any, are suggested, they are not to be interlined, but must go on a separate paper. Members are very sensitive upon the question of local laws and special acts, and this bill specially provides that it shall not interfere with any special act or any special legislation.

The report of the committee having been declared open for discussion——

E. SATTERTHWAIT, of Montgomery. Mr. President, I would request that the gentleman from Somerset (Mr. Musselman) would explain to us what particular defects in the present law it is proposed to remedy by this proposed act. We have a great many road laws, and this is adding one more to the list; I, therefore, fail to see exactly where the improvement will come in. Perhaps the chairman of the committee will explain this point.

C. C. MUSSELMAN, of Somerset. It is true that the road law is very lengthy, and yet there is very little of it; we propose in this report to levy a tax upon every male over twenty-one years of age in the Commonwealth. We propose to give some authority into the hands of the supervisors to enable them to collect at least one quarter of the taxes in cash; that they will not be compelled to let every person work out, or lounge out, as at present, his road tax; so that he, the supervisor, can by machinery, implements, and tools—all the modern appliances to make roads. These are some of the new features. It is proposed all through to make some improvement—for instance, there is a provision that no levy shall be made over seven mills. We think we can make better roads with less money by having the proper machinery and implements, and by giving the supervisors some power to collect taxes in cash, as is contemplated by this bill, than can now be done. We made this bill as short as possible. We did that for the purpose of sailing clear of objections. We thought if we were to draft a lengthy bill there would be objections; and, therefore, we made the bill as short as possible.

WM. L. BULL, of Chester. It seems to me, with great deference to the committee who have spent so much time in drafting this new act, which has just been read, that there are one or two serious defects which that act does not attempt to meet, and which make it very little improvement upon our present road laws. So far as I can see, we could have no better road law than the road law of 1836, if it were carried out, but the defect lies, it seems to me, here. In the first place, I think our system of supervisorships, as now carried out, has proved, during the last fifty or sixty years, a miserable failure. I think we need a business system of conducting and maintaining the roads introduced into our townships. Chester county is overburdened with local laws and special acts of various kinds, and we find that, whether we are acting under the general road law of 1836, or under the special law which allows us to sell out the roads for three years. In either case, the thing is a failure; that the second, which was supposed to be an improvement upon the old road law, is little or no better than the first. My own idea would be, which I do not think would add much, if anything, to the expense, is to take out of the hands of the supervisors entirely the maintenance of roads, and that they should be empowered by law to employ a road agent or commissioner for each township, who, for a fixed salary, (say $500 or $600 a year,) allowing him to hire so many men, horses, and carts, shall keep up the roads in his particular township or district. What is the result of the present road law? We know perfectly well that the office of supervisor is a political office; that, although the emoluments are slight, it is a position of some honor in the community, and men will seek for it, and very frequently obtain it, who are totally unfit for it, and who are not competent, or at least do not prove themselves competent, to keep our roads in proper condition. But I maintain, if one man is chosen by the supervisors, irrespective of his political opinions, then we can place it on a business platform, the same as is now pursued by the Pennsylvania Railroad Company.

Then, again, I think the great trouble is that we have too many township rights. We want a little more centralization. I know that is a dangerous word, especially when looked at from a political stand-point; but, I think, when considering the subject of roads which is a matter of interest, not only to the citizens of two or three townships, but to the people of the whole county, there should be some general supervision, some central controlling power. As His Excellency said this morning, and truly said, no law could be carried out unless there were some central power which alone should see that its various enactments were carried out. I think it is demonstrated beyond any dispute that we do need some similar power in reference to the carrying out of our road laws. You will find, I think, so long as you allow the working of the roads to remain in the hands of the supervisors, and subject to their judgment, the thing will continue to be a failure, as much so as at present.

There is one more aspect of the case. It is suggested that the supervisor shall have the right to raise cash directly of one fourth the amount necessary to be raised. Why should we say that the four fourths should not be raised by the supervisors just as readily? You know as well as I do what road-making turns out to be, when the supervisor calls out thirty or forty men in the course of a year to work upon them. The roads, year after year, get no better.

Hon. M. C. **BEEBE**, of Venango. This may be considered, and undoubtedly is, a very diminutive bill. It is a road bill. It suggests two or three amendments, not what they ought to be, but what there is the least prospective chance of getting through the General Assembly of Pennsylvania, without which it would be of no avail. I would say to our friend from Chester, (Mr. Bull,) that two years ago, when an effort was being made to revise a road law of Pennsylvania, the delegation from Chester county (a county which is considered very intelligent, influential, and well-posted upon general affairs) appeared at Harrisburg and protested against any innovation upon the laws of Chester county; that they had laws infinitely superior to anything that it was proposed to present, and crushed out, I might say, any efforts on the part of Pennsylvania for any revision of the road law, so that this is placed upon the simple proposition of endeavoring to secure certain things. Now, I wish to say that so far as Venango county is concerned, it is of no consequence, because they are able to purchase all this machinery, have done so, and have been using it for the last fifteen years. I was down through one of the eastern counties, near the city of Philadelphia, and I saw twenty men and boys at work. One had a shovel and another a pick. One had a horse and cart carting dirt. Others were smoking, and some were lounging, and some were discussing politics. I said to the friend I was riding with that I could take a road-scraper and a team and make three times as much road as that whole force was making, and put it in as good, if not better, order. Now, the general road law does not allow the purchase of road machinery. That is the main thing that this bill proposes to meet. The main point is to allow machinery to be used.

Take an improved road machine, put your road in order once, and (I speak from experience) thereafter your roads can be kept up, in far better condition than now, by a tax of half a mill. So that, limited as this bill is, it is an improvement upon the old law, by permitting the use of the fund for that purpose.

Our friend from Chester county said: "Why not collect and put the whole four fourths in?" Why, if you can get through a levy of one fourth, bless you, it will be a wonderful improvement! The only doubt about it is, *can* you get it through? Can you get it through to the extent of collecting even one fourth? It has not been long ago that a taxpayer in Bucks county objected to paying his tax because he had not been "warned out," or something of that kind, and the Supreme Court decided that any man could work out his entire tax, and that he could not be required to pay a cent of money until he had first had that opportunity of working out his tax.

That was the decision of the court, and that is what occasioned the first suggestion as to any change in the road law. Now, briefly, this bill proposes nothing but a modification to enable these two or three things to be done, and is confined to these few things simply because there is no prospect of getting anything more. For my own part, I would like to see a road law in the State of Pennsylvania covering every condition and requirement—an enabling act, broad in its provisions, and covering every case, from the poorest tract of country down to grading and turnpiking. The best mode would be an enabling act, containing a clause by which any township or community could avail itself of any provision of it. We have been introducing some such legislation in Pennsylvania—an enabling act containing a local option clause. We have a sheep law by which we can tax dogs for the protection of the owner of sheep, which never could have been passed if it had not been for this local option clause, which permitted each county, at a general election, to take a vote upon it. Now, I would like to have a general road law prepared in this way, with the broadest possible enabling act, to allow each community to avail itself by vote whether it will or will not; an enabling act adapting itself to all the conditions and situations in the State. When the Constitutional Convention of Pennsylvania did away with special legislation by reason of its abuse, they did away with legislation that was of immense beneficence in many respects. Many of our best institutions are the result of that local legislation, but it became so gross, so much abused, that the cry went forth to do away with it entirely. And yet you see that this broad want in regard to a general law is so prevalent that you observe, in the Legislature of Pennsylvania, time and again, a general law put through to cover some special case, in order to dodge the idea of special legislation. It pervades a broader sphere, and I have no hesitation in saying that the intention of the framers of the Constitution of Pennsylvania was violated by the decision of the Supreme Court by which the classification of cities of the first, second, and third classes, &c., was made in order to adapt legislation to the circumstances of the situation.

I would like to see a road law containing features by which the different sections of the State, according to their wants, could adopt any one of the provisions of the bill by virtue of the local option clause attached to it. Without that, any legislation attempted to be secured further than the privilege of levying a portion of the tax to purchase machinery, and to effect these little changes, I think it is useless.

I design to offer a single amendment. Our friend, in drafting this bill, has a sentence like this: "And in case of storms and floods the public roads and bridges are in such condition as to interrupt the public travel, and the amount first levied shall not be sufficient to keep the roads in necessary condition and repair." Suppose these roads were not in condition and repair by virtue of the seven mills, why should it take a flood in order to levy the other three mills? It is not necessary at all. Why not have the levy? The law requires that the supervisors shall keep the roads in good condition; and they are subject to indictment if they do not do so. Why not strike that out? I move to amend the bill by striking out "and in case of storms and floods, the public roads and bridges are in such condition as to interrupt the public travel, and the amount first levied shall not be deemed sufficient to make the necessary repairs," and substitute therefor the words "and when the seven mills so levied are duly expended, and said roads are not in good condition and repair, then they may levy three mills more."

E. SATTERTHWAITE, of Montgomery. I was in hopes that this Board was prepared to remedy this matter of the working out of taxes. I was in hopes that we were prepared to reform that altogether. In our part of the State, that is what we would like to have; but it seems to me, from what has been said here, that there is no use of talking about that; that the State at large is not prepared to go that length, or anything like it. The idea of collecting one fourth in cash is simply nothing.

As to our requirements, we have machinery, and we do work, in spite of the law, by machinery. We have no use at all of this law of working out the taxes, because we cannot do it, making the roads as we do by machinery. I am afraid that our people would not like the idea of being restricted to a tax of seven mills. We find that it pays to macadamize the roads, and our people would not like to be restricted to a tax of seven mills, because sometimes we want to spend a great deal more than that. We have learned that it pays to make good roads, no matter what they cost. Everybody says: "If you will make the roads good, we do not care for the tax." It is when you have nothing to show for the money expended that they complain—which is the objection to this working-out system. From the discussion that has taken place here, I see that our State is not prepared to do us any particular good. I see that we will have to go ahead, in spite of the laws as they now stand. We have gotten along without any trouble so far; but I do not know when the trouble will come.

C. C. MUSSELMAN. Mr. President, in order to save us the trouble of going any further into this matter, I accept Mr. Beebe's amendment, though I do so with great reluctance. I accept the amendment to settle this matter. I do hope that the bill will not be mutilated. If the bill cannot pass through this body without being mutilated, let us kill it at once. If it is approved by this Board, let us pass it, but if it is to be mutilated by amendments, then I would rather have it killed here.

The **PRESIDENT**, (Gov. R. E. Pattison.) The amendment of Mr. Beebe is accepted. Therefore, the original bill comes before the Board with the amendment of Mr. Beebe.

Dr. **J. P. EDGE**, of Chester. I think that the present general road law is sufficient for all practical purposes with the exception of the restriction in regard to the collection of taxes. If it were in the power of the supervisors to collect enough in cash to supply themselves with improved machinery, the objection to the working out of the taxes on the part of citizens would, to a very large extent, be removed by the economy that would result by the use of improved machinery. In other words, the machinery would do what men do now; it would only be in those cases where turnpiking would be undertaken that citizens would come in as helpers to any great extent. I think that the amendment proposed is insufficient in that feature; that it restricts the power of the supervisors too much in the levying of taxes. I have a word of explanation to say in reply to my friend, Mr. Beebe, as to Chester county. The improvement of the roads in Chester county has been marvelous in the last five years, in the southern part of the county more especially, in consequence of the introduction of improved machinery. As a consequence, several townships have had their local laws repealed, and others are here asking the Legislature to repeal their laws.

C. C. MUSSELMAN, of Somerset. I hope that you will allow me a good deal of latitude in the discussion of this bill. It must be remembered that the valuation of this great State of ours is increasing continually. In the section of country I come from, I do not think we ever levy a tax above seven mills, yet the valuation is going up all the time. The roads are about made. We are not having very many new roads constructed, and I think that seven mills are amply sufficient. I scarcely know what Mr. Beebe's amendment is. I accept it because I want to satisfy all the opposition I can.

M. C. BEEBE, of Venango. My amendment says that after the levy of seven mills has been expended and the roads are not in good repair, they can levy an additional three mills.

C. C. MUSSELMAN. Mr. President, the collection of one fourth of the taxes in cash is to provide for the modern appliances of making roads. This bill is the result of correspondence with the best men; we have consulted not only with lawyers, but with practical road-makers and supervisors, who agreed almost unanimously that something of this kind ought to be adopted. For that reason we have made it very brief, so that it should not meet with opposition. Now, to get all these amendments and proposals in here is absolutely out of the question.

A. M. FULLER, of Crawford. This subject is one to which I have given a good deal of attention. I have had correspondence not only with gentlemen in our own State, but with a great many in other States. There is not, so far as I am able to discover, a perfect road law in any of the States to-day. It is, we might say, the great necessity of the times. It is a thing which is sure to come, but it is going to require a great deal of study and application in order to accomplish it. I had hoped, so far as this Board is concerned, that you were ready to join with us in our association in recommending an entire change in our present road law. The recommendation which is made by this committee is merely supplementing our present law. It is very good as far as it goes, but the time is coming, and must come, and is very near, when we shall have to adopt a cash basis for the working of our roads instead of the present system.

I am very free to say that I would like to see a committee appointed by this body, and we will appoint a committee from our association (The State Dairymen's Association) to take this matter up, and give it two years of consideration. I have been at work at it for five years. We all know that it takes a great many years to accomplish a reform of this kind. I believe that by giving it careful attention—by taking advanced ground —we will eventually get a road law that will be agreeable to this State.

I am pleased to acknowledge that this suggestion of the committee is an improvement upon our present law. But the trouble is that we do not take advanced ground in the matter, and it is necessary for the accomplishment of an object of this kind for us to take that ground; and it is through these organizations that we are going to be able, eventually, to effect that change and improvement. Take the present law. All the time that law was enacted, most everything was paid in labor. You can accomplish more than half again with cash than you can accomplish under the present system with the full amount of taxes. I cannot find any one farmer who would not be willing to pay one half the tax in cash, and work under a cash system.

The working of roads in the early spring, in June, is all very well; but it is the little break in the roads that causes all the trouble. You want the same attention given to the roads that this city gives to its streets. When there is a break in the road you want it repaired at once, and not left until the next spring. I wish, indeed, that we could take advanced ground in this matter, because we are going to take that stand in north-west Pennsylvania. We will not be satisfied with any half-way measures, and, of course, we will endeavor to render all assistance in our power to obtain something better than we now have.

J. McDOWELL, of Washington. I was not present at the time this bill was read, and, perhaps, I have not got the text in my mind exactly. I wish to state, however, as a member of the Committee on Legislation, appointed by this Board to attend the meeting at Bedford, that I could not be present at that meeting. This matter was taken out of that committee's hands, and put into the hands of a special committee; and that committee reports the bill that I now hold in my hand. This, I understand, is merely a supplemental bill to the old law—that we need a road law. I think we will all admit that we can never support any law until the people are educated up to it. That has been my observation with all the laws we have. That the old law is defective beyond a doubt, that it is abused, I think all will agree.

Now, the valuation of property in our county (Washington) is estimated at seventy dollars per acre. It would seem that seven mills would be an enormous tax. That, added to the county and school tax, would require us to sell our property, and to get out of the State as soon as possible. But, Mr. President, we do not want to move away. We are loyal to old Pennsylvania.

I wish to say something as to the abuse of the old law. I agree with my friend, (Mr. Fuller,) who has just taken his seat, as to this labor tax, and that people had no means of marketing the products of their farms by which they could get money. I have been through that school and I am in it yet. It is abused in this way: In several of the townships of my county—in nearly all, I might say—it is a political man who will be supervisor of roads. Now, let me tell you what I have perceived from my own observation—I have the proof in my pocket, and can produce it if necessary —that when we come to work out the tax under the old law, the supervisor, who does not own a foot of land, will call just so many hands to work on the roads—say four or five; they receive two dollars a day, and we have always paid money to buy machinery. It is always making a bone of contention, and has ever since I can recollect—the getting the privilege of working out taxes. That is the way they draw their two dollars per day. The idea of taking four or five hands and putting them on the road with one or two teams, and putting mud on year after year is simply waste of time and money. There is nothing beneficial or lasting about it.

That has been the difficulty we have had with the old law. Now, whilst I think that this would be an improvement, yet I wish that there had been a clause in it fixing the wages that the supervisor is to get the same as the wages of the laboring men. Now, while this is not just the law that we would desire, yet I think I would favor it. We had this matter under consideration in our own county; we called the citizens together and we spent a whole week in framing what we thought would suit us; and we hoped that the other counties would not think that it was an innovation upon their rights, but that we had the good of the whole State at heart.

C. C. MUSSELMAN, of Somerset. I would state, in answer to the gentleman from Washington, (Mr. McDowell,) that the main part of this bill was taken from the bill that was framed in that body in Washington county which he has just named; and the bill that was discussed at Bedford was almost *verbatim*. We found that the cash tax would not carry, and then we thought we would make something like a compromise of the two extremes and have at least one fourth paid in cash, in order to get the necessary machinery to make the roads.

THOMAS J. EDGE, (Secretary.) Mr. President, during the nine years that I have been Secretary of the Board, I have noticed that the road question comes before the Legislature at every session; that after considerable time has been expended in committees and by both branches of the Legislature, the subject is left as it was before. I do not think, sir, that we will ever get a general road law which will suit all sections of the State. Some States, smaller than ours and with less diversified territory, have enacted laws which are satisfactory to the whole of the State to which they apply. We may readily draft an act upon which Chester, Montgomery, and Bucks can agree, but it would not prove at all satisfactory to Pike, Potter, or Cameron; the surroundings are entirely different. One county, because of its close population and large amount of travel, can go to an expense per mile which would deplete the treasuries of other counties. Mr. Satterthwaite, of Montgomery, hauls large amounts of farm produce to Philadelphia, and well knows the value of good roads, and knows that the amount of his load is gauged by the condition of the roads over which he has to haul. He does not object to ten or fifteen mills' road tax, provided it is properly and fairly expended. In his district the increase of a single mill means a large amount, and a seven-mill tax will give a vast revenue for permanent repairs and improvement; but in Cameron or Potter a seven-mill tax will not accomplish the same results. I have noted that all general laws meet with opposition from two directions: First, from such sections as already have good local laws and do not wish them interfered with; second, from the thinly-settled counties, which cannot afford the taxation often called for by the act. We can avoid both of these objections by making the act only applicable when a vote of the county shall have, by accepting its provisions, made it binding. We will then disarm both classes of opposition, and may incorporate in the new act any provision which may seem applicable to the opposite extremes of the two classes indicated. In my county, (Chester,) there are always enough of non-resident taxpayers who will pay their tax in money to obtain all of the improved machinery needed. We may as well accept it as inevitable that the "coming road" will be mended by improved machinery, by which two or three men and two horses will accomplish as much as twenty men under our present system. It will come in all the thickly-settled counties first, and afterwards in the others. After a road-bed has once been prepared for the use of such machinery, the work becomes much lessened and the cost very much reduced. In my own township, (New Garden,) the roads are divided into half mile, or less, sections, and sold out at public sale, once in three years, to the resident of the township who will contract to do the necessary work for the least money. In theory, this plan is correct, for the man who lives close by the road can often, by close watching, put on a few shovelfuls of earth, when, if neglected for a few days, it would require as many cart loads; but in practice it results in "whipping the horse that will pull," or, in other words, it is too often the case that the man who will mend his section has to do it well, while the one who is careless gets off with very little work. For these and other reasons, I have very little faith that the features of the act as proposed by our committee will meet with the approbation of a majority of both branches of the Legislature; but as the committee have expended considerable time and labor on the work, I would advocate a trial, and see how it will result. Our friend from Somerset is tenacious about the addition of any amendments, but he will not find the members of the Legislature as careful of his wishes as this Board has been. They have their own ideas in relation to the matter, and will not be slow to engraft them on the bill, and when they are through with it, I very much doubt whether its friends will recognize it.

J. MCCRACKEN, Jr., of Jefferson. In Jefferson county, we work out our tax as the law requires or permits, if we cannot help it. I believe that, as has been suggested, this proposed law may not be just what we all desire, but give us, in Jefferson county, one fourth of our taxes in cash and let our supervisors buy improved machinery, and in three years our people would be convinced that it is better to pay all of their tax in cash.

Note by the Secretary.—If the correspondence of the Board can be accepted as a criterion of public sentiment in relation to the manner of repairing roads and collecting the tax to pay the expenses of the work, we are forced to the conclusion that the main cause of dissatisfaction is to be found in the thirty-fourth section of the act of April 15, 1834, which provides as follows: "That before issuing the duplicate and warrant for the collection of road taxes, it shall be the duty of the supervisors of every township to give notice to all persons rated for such taxes, by advertisement or otherwise, to attend at such times and places as such supervisors may direct, so as to give such persons full opportunity to work out their respective taxes."

In Miller *vs.* Gorman, (38 Penn. St. R., 309,) it was decided that "the opportunity to work out the taxes is a condition precedent to the issuing of a warrant for their collection. Where they are assessed against non-residents, notice may be given by advertisement, but the tenants must be permitted to work out the taxes, if they offer to do so." In Childs *vs.* Brown Township, (40 Penn. St. R., 332,) it was decided that "supervisors can make no contract, the effect of which must be to deprive taxpayers of the privilege to work out their taxes."

Our correspondence plainly indicates that the objection to this section arises from a strong and growing desire, which exists in nearly all of the more thickly-settled counties, for the adoption of an improved method of repairing the roads by the use of labor-saving machinery, by which three or four horses can be substituted for ten times as many men, and at great saving in the actual outlay. If, as the law now stands, the whole of the tax levy may be paid in labor, it becomes difficult to obtain the necessary machinery and also do away with the manual labor, which the taxpayer may claim as his right, but to the serious loss of the township funds. During the past ten years, each session of the Legislature has witnessed one or more attempts to secure such legislation as will provide for, at least, a portion of the road taxes in cash and the balance in labor. Before the passage of the new Constitution found vent by the enactment of special legislation, which, at least, in part, relieved the pressure, but since the adoption of the Constitution this has been cut off, and those sections not already relieved by special legislation are applying for general legislation, which shall accomplish the same result.

In 1859, the township of West Marlborough, in Chester county, obtained an act from which we quote the following sections, as particularly apply to the branch of the road question alluded to. (See P. L., 1879, pages 39 and 40.) "Section 3. That it shall be lawful for the taxable inhabitants of said township of West Marlborough, at their next election for supervisors of the public roads, to elect three suitable persons as supervisors, one for one year, one for two years, and one for three years, and one person annually to serve for three years, any two of whom shall constitute a quorum to do business, and whose duty it shall be within fifteen days after their election, and every five years thereafter, to lay off and divide the public roads and highways in said township into sections, not exceeding one mile in length, which they shall number and describe in the road-book of said township. They shall also distinctly specify therein what they deem necessary for the improvement and keeping in good repair the said public roads and highways; and when the supervisors shall have so laid off the public roads as aforesaid, they shall, within three days thereafter, give public notice as provided in section first of this act, designating the time and place for the taxable inhabitants of said township to meet, at which time and place it shall be the duty of the supervisors to attend and sell out at public sale, for a term of five years, to the lowest bidder, the said roads, as described in sections, one section at a time, according to the terms therein specified, until they are all sold or disposed of, to be kept in repair for the said term of five years: *Provided*, That if any section or sections of said roads shall remain unsold, on account of no bids having been made for the same, it shall be lawful for the said supervisors thereafter to let out such section or sections at private contract: *Provided*, That the said supervisors shall not be directly or indirectly interested in taking or keeping in repair any section or sections so let out as aforesaid: *And provided also*, That not more that one fifth part of the amount of such sales and contracts shall be paid to the respective purchasers and contractors, in any one year, except in such cases as are hereinafter provided for." Section four provides that each purchaser shall sign his name to the contract in the road-book of the township, and shall give satisfactory security to the supervisors for the faithful performance of his contract. Section five prescribes for the removal of small stones and other items in the repairs of the road; limits the width of the road-bed, &c., &c.; it also provides that if the section is not kept in proper repair, the supervisors shall give the contractor six days' notice of such need of repairs, and, if not properly repaired in that time, it becomes the duty of the supervisors to employ hands, and, after putting the road in proper order, charge the expense to the account of the contractor. Since the date of this act, and previous to the adoption of the new Constitution, the essential provisions of this act (with some modifications) were extended to other townships in the same county and also to adjoining townships in other counties. By the act of April 9, 1870, similar provisions were extended to the counties of McKean, Bedford, and Venango.

The theory of the act was that each section would probably be purchased by an adjacent taxpayer, who could, by his proximity to the work, keep it in proper order at a much less expense than a more distant supervisor, whose duties extended to many other sections. In some cases, the provisions of the act have been repealed, and the work has gone back to the principles of the act of 1834. In all of the localities which have adopted these or similar provisions, it is safe to say that at the present time the people are ready for a still further improvement of their manner of repairing roads, and, so far as we have been informed as to their wants, all ask for the payment of a fixed proportion of the tax-levy in cash. While different sections vary in the amount which should be thus paid, we find the minimum to be twenty-five per cent., and the maximum to be the whole amount. So far as noted, it holds good as a rule that the more thickly settled the district, the larger the proportion to be paid, desire to be paid in money.

The desire now is for some system that will provide the law and the means by which the highways may be permanently improved, and that this improvement should, as soon as practicable, extend to all of the roads in the township. A majority of the taxpayers who are the most benefited by good roads are willing to pay an increased taxrate if they are assured that it will be economically expended and properly applied. In many sections, the want includes the construction of macadamized and telford roads for nearer lines of travel, and proportionate impost on all other side roads.

THE BEST HORSE FOR FARM AND ROAD USE.

By ISRAEL GARRETSON, *Member from Adams.*

Every country has a breed or breeds of horses, each with its peculiar characteristics, and the horses of Asia, Africa, Europe, and Amerca have their points of difference as strongly marked as do the human inhabitants of the four grand divisions of the globe.

Besides the peculiarities resulting from local influences of climate, the horse has others which are due to the treatment and training received at the hands of his master, since from a long course of artificial breeding and feeding has become a purely artificial animal, except among barbarians or savage tribes. Among savages, his hard environment has made him degenerate; has, in fact, reduced him to a condition inferior to that of the horse found running wild, where they have increased and multiplied on pasturable lands after having escaped from domestication. The farm horse is the most important member of the equine family, because that he is used by the largest number of people, and is employed in the production of that which sustains life in man.

The farm and road horses cannot lay claim to the dignity of distinct breeds, as they are composed of mixed blood, and are dependent for whatever valuable qualities they may possess upon the intelligence of the people by whom they are bred. The majority of farm and road horses are inferior to the more respectable of the fixed breeds, though of late years they have steadily increased in valuable qualities through the introduction of superior blood; and, in many districts, they are, as they should be, bred with reference to their sale for particular uses, after they have partially paid for their care by their labor on the farm. The farm and road horse should essentially be horses of all work, of good style and action, and about fourteen to sixteen hundred pounds' weight. Such horses will be able to do anything that may be necessary to be done about the farm, on the road, or plowing, reaping, hauling, or drawing the family carriage to meeting.

The people throughout the whole country begin to turn their attention toward the production of large horses from both necessity and profit.

They no longer find sale for the kind of horses they bred a few years ago, while there is an active demand for large, compactly-formed horses at splendid prices. Every man knows this to be a fact, but I doubt whether many have taken the trouble to inquire into the cause. The fact that large horses are readily sold at highly remunerative prices seems to be sufficient to warrant men in breeding to first-class stallions; yet a man who intends to invest very much money in the business should look for some more substantial reason than the mere fact of a good present demand. If small horses are low, and large horses are high, there is some good reason.

Whatever the causes are that have contributed to produce this effect, we ought to know in order to intelligently direct our future course of breeding. On investigation, we find this condition of the horse market is not confined to the United States alone, for go to what country we will—England, Ireland, Scotland, France, Belgium, or Germany—we find that draught-horses, during the last twenty-five years, have doubled and trebled in value. Many of us, within that time, will remember that a good heavy work-horse would only command from one hundred and twenty-five dollars to one hundred fifty dollars, and now three hundred dollars to four hundred dollars is looked upon as only a fair price for a good, serviceable, large horse, and often five hundred dollars is realized.

This advance in price is not because they are breeding less of the large kind. Quite the contrary; for, under the stimulus of constantly increasing prices, their production has been largely increased, and many of the most practical men of the time have become interested in the improvement and breeding of them.

Yet, notwithstanding their rapidly increasing numbers, the prices continue to advance, plainly showing that the supply is not adequate to the demand, and that there are needed and being used a larger number of draught-horses than ever before.

Why is this? A few words will tell.

From the commencement of the application of steam as a motive power, a new commercial era began which has changed all things. Railroads have superseded the stage-coach, and gradually thrown out of employ a vast number of small horses. The enlarged facilities for rapid, safe, and cheap transportation have swelled commerce to an extent never dreamed of under the old order of things, and opening a hundred new channels for the use of his heavy, muscular, and active horse. In the great cities, railroad centers, factories, foundries, mills, machine-shops, quarries, and in the lumber woods, thousands more are now annually purchased than were needed years ago. The American farmers are also beginning to find deep tillage and a more systematic and economical method of cultivation necessary, in which a large class of horses is indispensable. Thus, on every hand, we see the plan of usefulness of the large, strong work-horse extending, while that of the small family is yearly becoming narrower.

"I value a horse, of whatever weight he may be, whether one thousand pounds or twice that, for what there may be in him."

The best breeds for farm and road work, as my experience has been, are Percheron, Norman, and Clydesdale. The Conestoga horse holds a prominent place in the history of horses, one of the very best of American horses for draught, for all work in fact, on the road or on the farm, but he has become extinct as a breed.

The Percheron-Norman is described as follows: "Nostrils large and well dilated; eye good size, mild and expressive; forehead broad and full, ear short and fine. Neck rather short, but nicely filled out. Withers usually high. Shoulders long and nicely sloped. Breast broad and deep, body well rounded. Croup horizontal, broad and flat on the best varieties. Tail attached high. Joints short and firm. Feet always good. Skin very thin, and hair of the finest quality. Mane abundant and unusually fine and silky."

To remarkable strength, to vigor which does not degenerate, to a conformation that does not exclude elegance, it joins docility, mildness, patience, honesty, great kindness, excellent health, and hardy and elastic temperament. Their general color is gray, running from iron-gray to the handsomest dapple-gray.

"*Points of the Clydesdale.*—The jaw is broad and strong, and the muzzle, though neither well developed nor fine, is provided with large nostrils, capable of being widely dilated. The eye, though mild, shows courage and vigor. The forehead is broad between the eyes and capacious. The ears are rather long, and, by their intelligent motion, indicate activity. The head is well set on the neck, and the neck, as it swells to the shoulders, is massive, with great development of muscle on the top. The shoulder is tolerably oblique, fully so for a draught horse. The breast is full, broad, and strong. The leg is long from the arm to the knee, and short from the knee to the fetlock. The forearm is amply provided with muscle. The knees are large and bony, and, from the knee to the fetlock, and from the hock down, the limb is covered with long hair; at the fetlock, the hair becomes thick and shaggy.

"The back and body of the Clydesdale can hardly be called symmetrical; yet the barrel is round, with the ribs extending well back toward the hip. The quarters are broad and low, with muscular thighs, and large, clean, broad, well-developed hocks. The lower limbs are flat, as they will be in any horse well developed in muscle and tendons. The hoofs large, tough, wide, are joined to oblique pastern. The characteristic color of the Clydesdale is brown with white marks. The height is about sixteen and a half hands; and both in walking and trotting there is a majesty about their movements showing the power that nerves their action."

The PRESIDENT (Hon. R. E. Pattison) having declared the subject open for discussion——

J. D. HICKS, member from Blair. There is a general impression in the neighborhood in which I reside that the Clydesdale horse is liable to have weak feet, and inclined to diseases of the limbs and feet. I have three Percherons, and am partial to that breed. I think they will prove to be the horse for the farmer, and that they are a breed which we should encourage farmers to raise. I would ask the essayist if he has ever had any special trouble with the feet or limbs of his Clydesdales, and whether he knows anything of this opinion to which I have alluded, and which appears to prevail so generally.

I. GARRETSON, member from Adams. I have some Clydesdale stock, and I cannot go back on them, for they have always done me good service, but, at the present time. I am a Percheron man. I have a Percheron stallion and mares, and I think that I know their value. I admire the Clydesdale, and I cannot be so one-sided as to say that the Percherons are the horses for the farmer, and the Percherons alone. I am not aware of any special weakness of the feet or limbs of the Clydesdales; they being heavy horses, may be more liable to injuries of the feet or limbs, but, if so, it is more properly a defect in size and not of breed.

Secretary EDGE. In my own neighborhood the same objection has been made but with us it was considered to be a hereditary defect in a special family and not in the breed; that the trouble in our case was local, and due to breeding from a defective stallion.

J. W. MATHER, member from Tioga. I cannot agree, in very many particulars with the gentleman who has read the essay now before us for discussion. His topic calls for a discussion relating "to the best breed of horses for farm and road use." and he gives us a description of a very fine draught-horse—a perfect draught-horse—with a broad chest; a horse of good disposition, necessarily slow by reason of his build. Compare the Percheron and Clydesdale with the Hambletonian. The latter is a fast walker and a good trotter, while the former are both slow and sluggish. The farmer wants the most of his work done with his team on a walk; hardly any farm work is done at a faster gait than a walk. The object, then, in getting a horse for farm work is to get the one which will walk the fastest, and in plowing will get over the most ground in a day. It has been my opinion, and it is the result of both observation and experience, that our farmers should pay more attention to the walk as a gait, and to breeding good and rapid walkers. The horse which will walk two to three miles an hour cannot compare in farm utility with the animal that can walk four. The faster that you can get the horse to walk, the more service he is on the farm. A road horse that can trot a fair gait, and that is really a fast walker, (two of them drawing 3 500 to 4,000 pounds,) is a good horse, and is a good farm horse. The heaviest work on the farm does not call for a very heavy horse, but for one having activity and muscle rather than weight; one in which "spunk" will take the place of mere weight; a horse and not an ox. One weighing 1 050 to 1,200 pounds is heavy enough. If you get a much heavier horse, and push him to a trot on the public road for any great length of time, his feet will give out, and he goes lame on your hands. If your large, broad-chested horse, with a wide-open nostril, and broad between the eyes, is forced, he will, in nine cases out of ten, become lame or broken-winded. He is necessarily a large eater, for he must keep his large frame and big muscles. When you adopt this style, you get beyond the needs of the farm, and encroach upon the province of the team horse. When you want a horse exclusively for slow draught, you cannot do better than the Clydesdale or Percheron. For instance, take the cities of Philadelphia and Pittsburgh. They want an animal which will draw a heavy load at a slow gait, and they take the Clydesdale, the Percherons, or their grades. These large horses have their place, but, when you come to want a horse for all work on the farm, the horse that will take you to church, the store, or the shop, and, at the same time, be good at the plow and harrow, you want the Hambletonian or his get.

Do not take the heavy draught-horse and say to us, "Here is the breed that you want—the breed for the Pennsylvania farmer." Give me the horse of about 1,100 pounds, with a good, strong nerve, and he can stand your work; he can be educated, and, when thoroughly broken, is the best horse in the world for the farmer.

J. D. HICKS, of Blair. I do not wish to take up more than my share of the time of the meeting, but I think that the gentleman from Tioga (Mr. Mather) has gone a little astray on farm horses as we want them in Blair. His 1,100-pound horse may do very well upon certain kinds of land, and upon certain farms, but, on the average, heavy limestone land, particularly on the heavy clays such as we have at Morrison's Cove, and in Adams county, where our friend Garretson resides, and his 1,100-pound horse, which has the get-up and life which he so prizes, would wear out in one season. He could not pull a plow through my soil for any considerable time without showing the effects of it very plainly. We are compelled to use horses which will weigh from 1,300 to 1,500 pounds, and very often we cannot get them to go slow enough to do the work well. In my heavy limestone land, or in such soils as are around Morrison's Cove, where the rock is close to the surface, we would have to have a plow factory very convenient We want a docile team which will not get worked up, which will go slowly and steadily all day long, and they will accomplish much more and do it better than your light and rapid team. The gentleman who has read the essay has treated his topic from the stand-point of a farmer, and, to my mind, he has exactly hit the nail on the head. For teaming and hauling around town, the horse described by the gentleman from Tioga (Mr. Mather) is just the thing, but, from the stand-point of the essayist, I think the slow, steady horse is what we want. The farmer cannot afford to keep two kinds of horses, one for the road and the other for the farm, and what we want to get at is, What is the best breed that he can obtain for his general purpose? He cannot afford to keep the horse that can trot eight miles an hour, and have some other horse to do the farm work. A man who runs a bank might possibly afford this, but not the farmer who has rent or interest to pay on the first of April.

Hon. M. C. BEEBE, of Venango. The relative situations of my friend from Adams (Mr. Garretson) and my friend from Tioga (Mr. Mather) explains the difference of opinion which is developed by this discussion. It is true that, in a great measure, fashion shapes our agriculture largely. Dealers advertise for, and want, large horses, and our breeders, whether farmers or not, will endeavor to furnish what is wanted in the market. There is money in it to them, and they will do it for the profit which it affords. They breed for the market, and not for the farmer.

Now, for the practical points of the question. Our friend from Adams comes from a heavy soil, while the gentleman from Tioga comes from a lighter soil. They require for their farm purposes different kinds of horses, and each has described the animal which best suits the needs of his own district. In Mr. Mather's district the heavy team is not needed, and a lighter and quicker horse does better. In the section in which my farm is situated we want the general utility horse, which will weigh from 1,000 to 1,200 pounds, and cannot only do our farm work, but is also good on the road.

A MEMBER to Mr. Garretson. How far apart do you plant your corn when you work it with your Clydesdale and Percheron horses?

Mr. GARRETSON. We plant our corn about three feet nine inches to four feet apart, and, as regards tramping down the corn, I do not find the well-trained Percheron any more liable to injure it than lighter and quicker horses; they tramp no more corn than does a 1,000-pound horse.

But I have a word to say with reference to fast horses. I have been a farmer all of my life, and have had practical experience with both light and heavy horses, and what I have written and read in my essay is the result of practical experience. I have also raised three sons almost to manhood, and I know the effect of fast horses; give the son a fast horse, and the chances are that you will make a fast man out of him. We want our farmers' sons to take pride in the farm and its surroundings, and not run away from the farm; we want them to build up the nation and take our places when we are gone; if we furnish them with fast horses, they will sooner or later leave the farm, which is too slow for them; if we furnish them with the proper kind of a farm horse, they will take pride in him, and they need not be ashamed of the farm and farm life. In my experience, the heavy horse is the horse for all day; he is the horse in the morning and in the evening, while your light horse will be streaming with perspiration and before night is the lagging horse. The Percheron has a good, lengthy, and free step, and he will go as far in a day as a reasonable man should want. I have a Percheron mare which has worked on the near side of the binder all day and for three and one half days, when the lighter horse alongside had to be changed: they need power and muscle to help them along. In getting over soft places, I was surprised to note that this mare, weighing 1,680 pounds, sank in less than the horse, weighing but 1.200—the mare's feet were larger in proportion to her weight and supported her better. I am in favor of a good-sized horse both for the farm and the road.

G. **HIESTER**, of Dauphin. I have been very much interested in this question and have thought much of it during the past few years. It is a question in my mind whether the best horse for farm work is not the mule. I think Captain Moore, of Berks, can give us information upon this point. I believe that there are qualities in the mule which will suit both sides of this argument—he can be obtained heavy, he can walk four miles per hour, he will pull a good load, he is not always docile, he will kick you out of the stable if you do not want docility, and if you put your boy behind him on the road, you run no risk of making either the boy or mule fast.

W. G. **MOORE**, of Berks. There is a mean between all extremes, and safety and correctness are usually to be found in this mean. Mr. Garretson (the essayist) has described too heavy a horse for *all* purposes of farm work and farm requirements. The gentlemen from Tioga (Mr. Mather) has described a horse too light for all farm requirements. I have had much experience with horses and mules for farm work. The Philadelphia and Reading Express Company use Percherons, although they do not select the heaviest of this breed. They have been using them for several years and they seem to wear well at that class of work, which is more severe and trying on the feet than that of the farm. Percherons on the farm, in my own neighborhood, do not do the best work. Farmers are crossing them with their native mares, but it is yet too soon to tell how the cross will answer the purpose required; thus far, those who have tried the cross are pleased with it.

J. A. **HERR**, of Clinton. I think that the relative value of the different breeds of horses will depend much upon the locality in which they are to be used. An important consideration, not sufficiently brought out in the discussion, is that the farmer must have in view the disposal of his surplus stock, and that, as he must sell what the market demands, he cannot always profitably produce just the animal best suited to his farm work unless it happens that this class of animal is what the market demands. In the section from which I come, large horses are much more in demand than smaller ones—horses weighing from 1,100 to 1,200—and if the farmer has a surplus of this kind of horses he can readily dispose of them—they are wanted for lumbering purposes, and command a higher price than the average animal. If the farmer is to keep but one team, or pair, the animals which will best suit him in our neighborhood will weigh from 1,200 to 1,300 pounds each. No one team will fulfill all of the requirements of the farm—for hard work and for road driving; these are not to be found in one breed or in one animal, and we should not expect such a combination of qualities. We find that good, heavy horses will command the best price, and, consequently, we produce this kind of animals, knowing that the surplus will have a ready sale at remunerative prices. We must produce the kind which we can sell readily and at the least expense.

Secretary **EDGE**. We may assume, as a starting-point, that the character of the work must influence the kind of team needed. For our heavy clays and natural sods, horses weighing from 1,150 to 1,250 pounds will not be too heavy, but for team horses, intended for steady road work, heavier animals may be found more economical. As to the amount of food consumed in performing a given amount of work, I think it will be found that it depends somewhat upon the individual animal. For several years I used a pair of mares which, with their harness, weighed 2,500; they worked at the same double-tree and one required one third more grain to keep her in good working condition. It will not do to assume that either the amount of food consumed or the work accomplished is exactly dependent upon the weight of the animal; nor will it do to assume that, as a rule, speed in walking is dependent upon size or weight. At some kinds of work, and to a certain degree, speed may take the place of weight, and a horse of good speed and moderate weight be the most economical. It will not do to measure the whole of our farm draught by that required by a heavy clay or stiff sod; these are probably the maximum requirements, and, in deciding as to the character of the team, lighter draught and increased speed are well worthy of consideration. In light plowing a slight increase in speed means a great increase in the day's work. To the mowing-machine and harrow, speed is an important factor, and, as we cannot keep (on ordinary farms) a team for each class of work, we must, as far as is practicable, combine all in one. If we judge by the individual animal, we may, possibly, condemn any special breed, or, we may, on the other hand, unduly praise it, but, bearing in mind the fact that individual characteristics have much to do in making the "best team for farm work," we will probably decide not to exclude or include any special breed, but endeavor to procure the proper animal irrespective of breeds.

BEST BREEDS OF DAIRY CATTLE.

By Wm. Fairweather, *McLane*, *Erie County*, *Pa.*

We find the question often asked in agricultural papers, which is the best breed of dairy cattle? In these days of strongly competitive dairying, the ambitious and progressive farmer is anxious to know what kind of cows will yield him the largest returns for the least possible outlay. To answer this question satisfactorily, it would be necessary to know the locality, circumstances, and surroundings of the prospective investor, and in what manner he proposed to utilize the milk, whether for butter, or for cheese, or for family use.

In this paper, I propose to lay before you the merits and demerits of the most popular dairy breeds, and their suitability to special and general dairying.

The best known breeds of dairy cattle in this country are the Ayrshires, the Holsteins, and the Jerseys. The latter are the most numerous, and represent the greatest amount of wealth invested. The Jersey may well be termed the rich man's cow, for it requires a small fortune to get a good one.

Jerseys are chiefly noted for their butter-producing qualities. They give a moderate amount of milk, rich in butter-fat, and individual animals have produced more butter from a given quantity of milk than cows of any other breed. The Jersey is strictly a butter cow, and her usefulness is limited to that peculiarity. Her milk is not as suitable as some others for family use, on account of the rapid rising of the cream globules and their rapid concentration into a tough, leathery mass, which will not again easily mix with the milk, and Jersey skim-milk is a thin, blue, and not particularly appetizing-looking compound. Another peculiarity of Jersey milk, and one which is a source of great trouble to breeders, is the effect it has on young calves, causing them to scour nearly all the time during which it is furnished them for food. Any one who is familiar with Jersey calves will have noticed the unthrifty appearance which they present while being fed on the milk of their kind. I will here relate a little incident about a Jersey calf. A friend of mine had one shipped to him from the neighborhood of Philadelphia. On getting it home, he was very much disappointed with it on account of its unthrifty appearance, and mildly wrote to the shipper, asking what he fed his calves on, or whether he fed them at all. The characteristic reply came back, that Jersey calves were always thin, it was a peculiarity of the breed. My friend decided to try if he could cure this "peculiarity," as far as this particular calf was concerned, and put it on an Ayrshire cow. In a few weeks it was as plump and sleek as anything in his barn. This idea has not, I believe, been patented, and Jersey breeders are at liberty to use it freely.

The breed next the Jersey in numerical strength is the Holstein. They are a large, heavy-boned animal, and, on account of their size, have filled the popular eye. The qualities of the Holstein, with one exception, may be summed up under the heading of the adjective large. She is a large cow, with large bones, a large milker, and a large feeder. The exception to which I have reference is her butter-producing qualities, which are *small.* But, as there is a place for everything, there is a place for the Holstein. There is no doubt but that her native home of Holland is the most congenial to her wants, and that, wading in the luxuriant grasses of that country, she is a more profitable animal to her owner than she can ever hope to be in this country, with its dry, hot summers and sunburnt pastures. Yet, in the Western States, where grazing is free and corn is so cheap that they use it for fuel, she may be made profitable, for she has, without doubt, an enormous milk-yielding capacity, but it requires heavy feeding to sustain it. Notwithstanding that individual animals of the Holstein family have made good butter yields, the fact still remains the same, that, as a breed, they are poor butter producers, their position in that respect being the lowest among the dairy breeds. Samples of Holstein milk, from cows exhibited at the dairy shows, Islington, London, from 1879 to 1883, showed, by analyses, an average of 2.96 per cent. butter-fat and 11.8 solids. The average quality of milk sold by the Aylesbury Dairy Company, of London, as determined by daily analysis, was 3.74 per cent. of fat and 12.96 per cent. of solids.

In this paper, I have carefully avoided giving private milk or butter records, for the reason that I consider them of no value in determining the position of the breeds. I have, instead, given the most reliable tests, by competent and disinterested authorities, which I could obtain. There are exceptions to every rule, and it would not seem a difficult matter for the owner of five hundred head of cattle to pick out half a dozen, or even a dozen cows, feed them high, and get returns out of all proportion to the average yield of the breed. He then unfurls his flag to the breeze with the legend inscribed—*The largest milk and butter producers on earth.* Such has been done, and many have been deceived thereby. It will, therefore, behoove the wise farmer to make careful inquiries into the true inwardness of such loud-sounding statements.

The average farmer's idea of a milch cow is a large animal, something that, after he has milked her for eight or ten years, he can, at considerable expense, make into fourth-class quality beef, the question of feeding several hundred pounds of unprofitable carcass, during the period of her milking career, never entering his head. Just think of a farmer, when buying a mowing-machine, selecting one of the heaviest and most cumbersome make, simply because there will be so much more old iron in it when it is worn out as a mower and he has to dispose of it to the scrap merchant; or think of a man buying a twenty horse-power engine to do the work of ten. It will consume more fuel to do the same work, take up more room, and be more expensive generally. Broad-gauge railroads were found to be less profitable than narrow ones, and so it is with big cows in the dairy. Large cattle for dairy purposes are a grand mistake, and the form of the profitable beef producer is not the form of the economical milker.

We now come to the least numerous and yet most profitable of the three milk breeds, viz: The Ayrshire. This breed of cattle originated in the county of Ayr, in Scotland, and has been carefully bred for more than a century by the thrifty and painstaking Scottish farmer, as a model dairy cow. The Ayrshire occupies a middle position between the two extremes of Jersey and Holstein. She is a cow of medium size and economical build. She yields milk in good quantity and of most excellent quality, it being well fitted for either the milk retailer, or for the production of butter or cheese. I will not tax the patience or credulity of this audience by giving a long list of milk and butter records to substantiate the value of this breed. It is unnecessary, for the testimony of the best authorities on dairy matters goes to show that, for the amount of food consumed, the Ayrshire is the most profitable breed of dairy cattle. The Ayrshire breeder is not dismayed at the enormous milk yields claimed for the Holstein, nor at the abnormal butter records credited to the Jersey. He has no ambition to emulate such yields. Why? Because there is no money in them; they do not pay, and those who are engaged in breeding Ayrshires have neither the time nor the disposition to engage in this milk-record fabulation. Ayrshires have not as yet been degraded into being used as the pampered pets of the wealthy speculator, who expects to get his returns out of his cattle on the strength of fabulous milk and butter yields, by selling the descendants or relations of the wonderful prodigies at enormous prices. On the other hand, the Ayrshire is the poor man's cow, and is principally owned by intelligent and industrious practical farmers and dairymen, who expect to make a living out of the legitimate products of their dairies. In the southern part of Scotland, the milk of the Ayrshire is used almost exclusively in cheese dairying, and occupies the entire field.

The cheese produced from Ayrshire milk is so much superior to the product of the mixed milk of this country that it retails generally at about four cents a pound higher. It can also be produced at less cost, the milk containing a large percentage of cheese-producing elements. The cheese dairies in Ayrshire yield an average of five hundred pounds of cheese to the cow for the season, and such an experienced authority as Robert McAdams, now of Rome, New York, says that during twenty-seven years of dairying with Ayrshire cows, the average yield of cheese (excepting one year) was over five hundred and twenty pounds per cow per annum. Compare that with the general yield of the factories of New York State, where three hundred pounds of cheese per cow is the average. The milk records of Mr. McAdams' dairy, as shown by the cheese factory returns for one month, were as follows: Sixty-four Ayrshires yielded 66,197 pounds of milk, or 34½ pounds per day for each cow, making 6,421 pounds cured cheese, being at the rate of one pound of cheese to $10\frac{14}{100}$ pounds of milk.

Having demonstrated the superiority of the Ayrshire as a milk and cheese producer, let us now examine into her butter-producing qualities. In 1879, at the London dairy show, an Ayrshire cow carried off the prize for richness of milk, and in 1880 stood second on the list, the per cent. of butter-fat for the two years being 5.57 and 6.82. Dr. Sturtevant gives, as the result of thirteen analyses of Ayrshire milk, an average of 4.33 per cent. of butter-fat. Ayrshire milk, as analyzed by the chemist of the Pennsylvania State Agricultural Society, from cows exhibited at their annual show, at Philadelphia, in 1884, showed 4.58 per cent. butter-fat, 4.91 casein, total solids, 14.25. The mixed milk of eleven Holstein cows from a herd in Chester county, for the months of April and May, on dry feed, showed, as per analysis, butter-fat, 1.82, casein, 3.75, total solids, 11.46. Tests made by Prof. Brown, of the Ontario (Canada) Experimental Farm, on summer feed, gave an average for the three dairy breeds, as follows:

	Fats.	*Solids.*
Ayrshires, ...	6.85	15.25
Jersey, ...	5.89	13.85
Holstein, ...	3.90	11.00

But probably the most useful, practical, and trust-worthy account of the value of a breed of butter producers will be found in the following notes of the tour of a model dairy in Scotland. On the 18th day of August, 1884, the Scottish Dairy Association started on a three months' tour among the farmers in Ayrshire for the purpose of showing the improved methods of making butter. They had a complete outfit of dairy implements, including separator, butter-workers, testing appliances, cream-raising inventions, churns, refrigerators, etc. At one farm for a week it took only two gallons of milk to make a pound of butter. At other farms the quantity varied from two or three gallons of milk to the pound of butter. Thus it will be seen that the average quantity of milk required for a pound of butter, in the district of Ayrshire, (where, I need hardly state, the cows are all Ayrshires,) was about twenty-one pounds of milk for one pound of butter. In the State of New York, it takes over twenty-five pounds of milk, on an average, for a pound of butter, and the comparison is still more striking when we find the average yield of the best dairies of native cows in that State to be under four thousand pounds of milk, while the general average is under three thousand. In Ayrshire, the general average per cow is five thousand pounds for the season.

Having shown conclusively, and proved by the most reliable authorities on dairy matters, that the Ayrshire excels as a producer of milk, butter, and cheese, what more is there to say in her favor? I can only say, that if you wish to verify what I have said, try her. Ayrshires can be bought to-day for less money than any other class of thorough-breds, and experience will prove to you their value, that they are easy keepers, economical producers, and for all dairy purposes combined, the most profitable breed of cattle.

The topic having been declared open for discussion——

Col. V. E. PIOLLET. Mr President: The gentleman naturally advocates the cause of the breed which he has, and with which he is best acquainted. He has failed to mention a breed which I deem very important to the welfare of our State and her beef production, viz: the Durham or Short-horn. Our county (Bradford) is a dairy county, and produces more than any other county in the State. As to butter product, it ranks with any county, except, perhaps, Bucks and Chester. Living away from populous centers, we have to make use of our skim-milk at home. Our dairy cows give us about two hundred pounds of butter per year, and rear their offspring on skim-milk. The calves are raised and fattened ready for market at twenty-four months old. We feed mainly on skim-milk, only adding enough meal to make them fatten readily. We want the animal and breed which will make the largest weight on the scales at a given age, and we find the Durham or Short-horn to be the breed for us. I think the Durhams are kings of cattle.

Secretary EDGE. I would direct the attention of the gentleman to the fact that the essay alluded to the best breed for the dairy, and not for the shambles. It is probable that Col. Piollet and the essayist will agree when they both discuss the question from the same stand-point. Mr. Fairweather will, no doubt, admit, as he must, that, for the purpose for which Col. Piollet feeds, the Durham is the best for him.

Col. PIOLLET. When I first commenced the business, our farmers would raise anything to sell, and would breed from any kind of stock. I used a male over two years old, and had more productive cows and heavier calves than anybody else. Practically, I did not take much stock in the Channel Island cattle. They are not the breed for the butcher; they do not have weight enough. Of the Durham grades, I last year sold eighty to ninety head averaging twelve hundred pounds. I this year expect them to weigh twelve hundred at twenty-four months old. I have never had a calf killed on my farm. I do not want to see farmers paying high prices for stock which will not give them satisfaction for the purpose for which they want them. I do not buy cows, but raise all that I need. One of my cows was nineteen years old, and had raised twenty-two calves. She weighed, when fat, sixteen hundred. She was fed on turnips and meal until ready for the market. For me there is nothing so good or so profitable as the Durham.

Secretary **EDGE.** I would again urge the point which I endeavored to make before, that the breed selected must, in great measure, depend upon the purpose for which we keep them. On rough, mountainous land, where food is scarce, Col. Piollet's Durhams would not give satisfaction. For the butter market of large cities it has been found that smaller breeds, which, like the Jerseys and Ayrshires, convert much more of their food into milk and butter, will give a much greater profit than the Durhams or their grades. I believe, with Col. Piollet, that, for beef at a limited age, say two years, nothing can equal the Short-horns and their grades; but, for butter, the Jerseys, Ayrshires, and their grades can readily exceed them in quantity and average profit per head.

EASTBURN REEDER, of Bucks. I have a thoroughbred Jersey cow, thirteen years old, which has reared thirteen calves, but one at a birth and bids fair to have more. In raising calves upon thoroughbred Jerseys, there is a difficulty, from the fact that the milk is too rich in fats. For raising calves, all will agree that the milk of some other breeds is better, and will give more growth and weight in the same number of months. For this reason, if the breeder is not careful, he will lose a large percentage of his young calves. They should skim off a portion of the cream, and it will still have a sufficient proportion of fat for rapid growth, and the calf will do better. If Jersey breeders will adopt this plan of removing, at least one half of the cream, the percentage of calves lost from "scours" will be very much reduced.

Col. **PIOLLET.** How about selling that cow for beef?

Secretary **EDGE.** It will not pay to sell her for beef; she pays too well in butter. It will pay to keep her for butter as long as she lives, and her total product in money will be much greater than if she had laid on fat like the Durhams. The true test is the total product. It will pay her owner better to let her die as a milk cow than to sell her at ten years old to the butcher, even for ten cents per pound dressed.

Col. **PIOLLET.** I have had a great deal of trouble in feeding and raising calves, and I have never, until this year, accomplished what I desired in this respect. There is usually a disposition to feed too much, and to try to force the calf too fast—to feed it more than it can assimilate. Until the calf is two months old, we will not give it more than six quarts per day. It should be fed punctually and with exactness. I use measures made in such a way that they will not hold more than enough for one feed; that is, three quarts at a time. As a consequence, I have the best lot of calves that I ever fed. Many calves are injured and stunted by being fed too much at a time.

M. W. **OLIVER**, of Crawford. If I lived near a large city, and wished to sell milk, I would keep the Holsteins. They give large amounts of rich milk, and it has been repeatedly demonstrated that their milk is of the best quality. If I had other objects in view, I might raise a Devon, an Ayrshire, or a Jersey. In a recent test of five cows of each breed, (Jersey and Devon,) made in Iowa, the Devons, in each case, came out ahead. Dr. Morris has stated before this Board that he thinks that there is no milk equal to that of the Devon. If I wanted a smart, active yoke of oxen, I would prefer Devons or their grades. They are beautiful cattle and useful. They are not vicious, and will lie closely together in the yard or stable without quarreling. For butter alone, no breed can exceed the Jersey in either quantity of

Mr. **FAIRWEATHER.** The gentleman has stated that if he lived near a city he would keep the Holsteins for milk. There was a special test made of Holstein milk, and it showed three and ninety hundredths per cent. of butter-fat and eleven per cent. of solids. The State law of Minnesota, and that of New York and Boston, call for from twelve to thirteen per cent. of solids, and anything less is, by law, deemed to be adulterated. The Holstein milk of the test to which I have alluded, would not pass muster under these laws. It does not come up to the average required.

H. M. **ENGLE**, of Lancaster. There is another breed which has not been mentioned here, and that is the Guernseys. They are larger than the Jerseys, and not quite so neat, but produce more milk in quantity, and quite as much butter. They are, also, large, and, at the same age, will make more beef for the butcher. They are less delicate than the Jerseys, and less liable to disease in our changeable climate. I have both, and find the milk of the Guernsey higher colored (more yellow) than that of the Jerseys. We like them better.

Secretary **EDGE.** The question of the richness, quantity, and color of the milk is, after all, very much a question of individuals. I have had cows of no special breed that gave as rich milk as any Jersey, and I have had Jerseys which gave very poor milk. It will not do to judge any breed by a few individual members of that breed. The breed must be considered as a whole, and not by individual members. By this standard it will, I think, be found that the Jerseys give the richest milk; the Guernseys more of it. The Durhams vary very much with the family from which they come, some being heavy milkers, and others very poor; some give rich milk, and others very thin. As a breed, they vary more than any other. Col. Young's Jerseys are not a fair type of the breed; they far excel the average, and in weight will compare favorably with some of Col. Piollet's Durhams. In milk, they will far excel them, both in quantity and richness. Any one who judged the Jerseys by what Col. Young's cows can do would be grievously disappointed, for it would be very difficult to duplicate them anywhere in this or any other State.

C. C. **MUSSELMAN**, of Somerset. Some one has said that "one man is as good as another, and sometimes better;" and so it is with cows; some are suited for milk, some for raising calves, some for beef, and some for butter; but I think Colonel Piollet is about right in claiming that, all things considered, they are the best breed for the Pennsylvania farmer; each breed has its good points, but the Durham comes as near to perfection as any of them.

Secretary **EDGE.** The remarks of Judge Musselman suggest to our minds that imaginary animal the "general purpose cow." Is there such a thing? Good for all purposes. Can we obtain a cow, or a breed, which shall fulfill all the purposes for which the Pennsylvania farmer wants a cow? I think not. A heavy milker of rich milk cannot lay on fat. She will not and cannot raise good veal calves, nor good ones for growing, either. The farmer who makes butter a specialty can very well afford to keep a kind of cow which is good for that alone, or for that mainly. If she will give him three hundred pounds of butter a year, he can afford to let her die on the farm, and he need not care how much, or how little beef, she makes. If he raises cattle like Colonel Piollet, he can afford to keep that breed which will best suit his purpose, regardless of the amount of milk which they give, or the butter which they make. He wants large, growthy calves, and not butter or milk. No other breed will give him these so well as the Durham. The "general purpose cow," to my mind, has not, and ought not to have, any existence at all; she is an imaginary animal entirely.

THE VALUE AND PRESERVATION OF POULTRY MANURE.

Mr. J. W. Hicks, member from Blair, having read an essay on "The Value of Poultry Manure," and the subject having been declared open for discussion by the President, the following discussion ensued, and is here presented in a condensed form:

H. M. **ENGLE** of Lancaster. The essay has certainly brought out a number of important points, which should not be passed without discussion. I believe that the opinions and theories advanced by the writer will be indorsed by every practical member of our Board; but the matter is still unsettled; that is, the actual or comparative value of poultry manure. All who have used it will admit that it is one of the most valuable fertilizers to be found on the farm, and that it is in the most concentrated form. A large amount of the barn-yard manure as used by our farmers is but little more than wet straw, dampened with the excrements of animals, and I believe that the same holds good with much of the poultry manure. Its value does not seem to have been definitely settled by chemists. On page 94, of one of our quarterly reports, an analysis of chicken manure is given. I purchased the manure in the spring, and, having reason to think that possibly it had been leached by rains, I sent a sample to the Secretary, and thus it reached our chemist. The analysis by Dr. Genth gave, of insoluble phosphoric acid, two and one half per cent., potash, one and one quarter per cent., and of ammonia, three per cent. When compared with some of the best of our commercial fertilizers, these percentages are certainly small, and hence my belief that it had been injured by exposure to rain. I am satisfied that if a fair sample could be procured, that it would give better results. I am satisfied that this analysis should not be accepted as settling the value of poultry manure at all. The value of this sample is given as fourteen dollars per ton. This is a low showing when compared with commercial fertilizers, and I trust the matter will be investigated further. If several members of the Board will furnish the Secretary with samples, with a description of the manner in which it has been taken care of while accumulating, it would soon enable him to settle its comparative commercial value as compared with other fertilizers in the market. I paid fifteen dollars per ton for it, and from the effect produced, think that it was cheap at that price.

Secretary **EDGE.** Dr. Genth reported that the same contained a considerable percentage of sand. This of course would reduce the percentage of all of the valuable elements. For a fair test the sample should be free from any adulteration, or if loam has been mixed with it to prevent the loss of volatile elements, the ratio of this addition should be known.

H. M. **ENGLE.** This shows the great importance of having several other analyses made before we assume that we have ascertained that we have found its market value. I hope that the members would send samples so that we may have a full and complete report at a subsequent meeting.

Secretary **EDGE.** Another sample of chicken manure, which was said to be entirely free from any adulteration, was found worth thirteen dollars and eleven cents per ton. Of three samples which we have tested, the average valuation has been thirteen dollars and eighteen cents per ton. It is a very difficult matter to obtain a sample which will represent the value of poultry manure as a whole; so much depends upon the food which they consume, the manner in which the manure has been taken care of, and those who know how careless some are in caring for this important fertilizer, will easily see that even a dozen analyses would hardly settle its comparative value except under certain circumstances and conditions. From my knowledge of the general manner in which this fertilizer is exposed to losses from rain and from evaporation, I should say that these analyses are quite high enough for the *average* pile of chicken manure.

C. C. **MUSSELMAN** of Somerset. I have been interested in the theories developed by the essayist, and will supplement them with some of my own practical experience. I mixed ground bone with the scrapings of my chicken-house—nothing but bone-dust—and I am satisfied that if our farmers will buy this, they will not be persuaded to give it up easily. The mixture may be sifted and drilled with the grain and will produce wonderful effects upon any crop to which it is applied.

Secretary **EDGE.** Care should be exercised in drilling it in with the grain. Any fertilizer rich in volatile ammonia is liable to prevent the seed from sprouting, or to kill it after the sprout has started. Care will be necessary in this respect, or disappointment will ensue.

J. S. **KELLER** of Schuylkill. So far as the chicken manure and bone-dust are concerned, both are very valuable fertilizers, but the assayist has named leather scraps along with the ground bone. How can he get the leather scrap into a form in which it shall become available to the plant? I have tried getting leather scraps from the shoe factory into an available shape, but their action is so slow that I do not consider them of any value. I cannot see any effect from their application at all. If they could be carbonized without driving off their ammonia, they could be made effective, or if they could be ground fine without being decarbonized, they would act much better; but in applying them raw I have had very bad results.

Secretary **EDGE.** The nitrogen in leather scrap is locked up by the tannic acid which is used to preserve the leather, and no element in the soil seems to have the power to break up the combination; if the plants can obtain this nitrogen at all, it must necessarily be very slowly indeed, and scarcely noticeable in its effects upon the crop. Ground leather scrap and hoofs contain a considerable proportion of nitrogen, but no process is yet known by which the combination with tannic acid can be broken up without making the nitrogen too expensive for use in a commercial fertilizer. Thousands of dollars have been spent in the attempt, and these attempts have been to a certain extent successful; but the cost of the product is too high for use in a fertilizer, and the attempt has been given up as impracticable. From this I do not wish to convey the idea that ground leather scrap and hoof-dust are not of any value as fertilizers, but for the reasons which I have given, their action is so slow that their actual value for this purpose is very low indeed. The same amount of *available* nitrogen can be obtained at a much lower cost in some other form. By all means apply all of the leather scrap which you can obtain at a price proportioned to its value, but do not be misled into paying thirty dollars per ton for it on account of the nitrogen which it contains.

JOHN McDOWELL of Washington. If I understood Mr. Hicks rightly, he conveyed the idea that the roots which are left after a crop of clover hay is taken off the field are of but little value as a fertilizer; if so, I must certainly disagree with him.

J. D. **HICKS.** I said of comparatively little value; that is, as compared with the clover hay taken off.

JOHN McDOWELL. Even that I am not willing to accept. As the result of my own observation, we know that the clover may be cut off for several years in succession, and that during that time the roots penetrate deeply into the soil. In fact, I do not think the farmer can plant any crop which will leave so much fertilizing elements in the soil. I also think that he erred a little in censuring the use of bone so heavily. In my neighborhood, we (not all of us) are careful to collect all the bones we can, and apply them in some form or other to the soil. Another thing we think that we have found out by experience, and that is that it pays to put sheep and barn-yard manure out in small heaps soon after it is formed in the yard and spread it at once, even on the frozen soil. We can make no other application of it which gives as good results as this.

J. D. **HICKS.** In reply to these queries, I have this to say: That I do not pretend to detract from the value of poultry manure from a scientific stand-point, or viewed as a chemist would view it. I do not pretend to know anything about that. I have given the practical experience of a number of years' use of it, and have obtained the culminative experience of a number of our best farmers as to its effects. As to leather scraps, I have not used them by grinding them into a powder. I have put them around the roots of apple and quince trees, and find that they seem to exercise the power of concentrating and holding moisture, and in that way I claim that they are of great benefit to the fruit-grower. And, as to the remarks regarding the use of fresh yard manure as soon as it is formed, I contend that this is the proper way to use it so as to obtain all of its fertilizing value. By letting it lie in the yard all summer, we no doubt lose a considerable proportion of the ammonia, and, if leached by rain, other elements are also lost. With poultry manure, you should gather it together so that it may be composted with some absorbent, so that a similar loss may be prevented. By composting it with road dust, you can hold the ammonia as well as any other way and at as little cost. I agree with the gentlemen as to the use of bone-dust, but this is not an absorbent of ammonia. We want some article which has the power of fixing these volatile portions of the manure. Last year I applied this composted chicken manure to my barley crop, alongside of high-priced commercial fertilizers, and the result was satisfactory and astonishing. I have used this mixture alongside of the Swift Sure phosphate; I have used it alongside of the Bowker phosphate, but in all cases the mixture has given me the best results. Taking the analysis as alluded to by my friend from Lancaster, you still have a very cheap manure at fourteen dollars per ton. It has more ammonia than many of the thirty-eight-dollar phosphates in the market. In relation to the application of yard manure, my friend from Washington and myself will not disagree at all. The results as given in my paper are not the result of scientific investigation, for I am not a scientific man. In corroboration of them, I have the practical results of Mr. Baker and Mr. Christy and my own experiments as I have narrated them to you. Dr. Voelker is my authority for supposing that the clover roots left in the soil are of comparatively little value as a fertilizer. My own experience is, that unless you plow down a crop of clover, or unless you manure your clover field, from which you have taken the crop, the clover roots will not keep up its fertility. If you follow a crop of clover hay with wheat, without any manure, you will obtain a very small crop for your trouble. It is true that the clover roots will bring a certain amount of vegetable matter to the surface of the ground, but, unless you plow down the tops also, or give the field a dressing of phosphate or manure, you will find the result far from satisfactory.

JOHN McDOWELL. Our plan is to plow down the clover sod for corn, and turn them up again for wheat the next fall.

H. M. ENGLE. I had no desire to controvert the gentleman's theory of the value of poultry manure; I only intended to ascertain why, from its formation, it is not more valuable by analysis. With reference to the value of clover roots as a fertilizer, I must differ with the gentleman from Blair. I have been farming for forty years. We used to farm on the six-crop rotation. We now farm on the three-crop rotation. We let the clover lie for two years, and then put it in with corn, and our experience has been that we can raise a full crop of corn on a two-year-old clover sod plowed down, without any additional manure of any kind. I have from eighty to eighty-five bushels per acre in this way. Then we follow the corn with oats, and them with wheat, with yard manure. If we crop twice, once with hay and once in pasture, we get an excellent crop of corn, showing that there must be some value in something which the clover leaves in the soil.

Prof. **W. H. JORDAN** of State College. I hardly like to have the statement go out as made by the gentleman from Blair. I have studied Dr. Voelker carefully for several years, and have never found anything in his writings to warrant the opinion that he considered clover roots of little value as a fertilizer. The amount of them left in the soil after a good crop of hay has been removed is surprising, and will far exceed the estimates of those present here. The amount of material in the upper part of the plant of course exceeds that in the roots. Several careful experiments have been made to determine the weight of roots left by the clover plant. They have been found to vary from six hundred to two thousand pounds per acre. The amount of fertilizing value in fifteen hundred pounds of these roots is large. If there are two thousand pounds per acre, they would readily support the following crop of corn. Mr. Hicks states that a crop of wheat on a clover sod, without manure, will not amount to much. This does not seem to me to prove anything. He has taken a large portion of the clover roots off in his corn crop. We find at college that the use of the best commercial manures has the effect of increasing the corn crop but very little, but where we put the còrn on clover sod, the effect of the fertilizer was very much more perceptible, thus showing that the plant can obtain its food much more readily where such a sod has been turned under and the roots allowed to assist the fertilizer. The roots are very rich in the three elements alluded to, viz: phosphoric acid, potash, and nitrogen.

A DELEGATE. I make a specialty of poultry-raising. My plan has heretofore been to wheel the droppings from the roosts into the barn-yard and scatter them broadcast over the yard manure; but this year I have mixed them with plaster and have barrelled them up. I have mixed unleached wood-ashes and plaster with them; and I wish to ask the question here, whether this mixture of ingredients is right and proper? I have been very successful in the chicken business, selling last year two thousand dozens of eggs. Heretofore I have neglected the chicken manure entirely, allowing it to be scattered over the yard as before stated. If there is anything wrong in this mixture, I would like to have some one say so. I suspect that there is.

Prof. **JORDAN.** If I understand the gentleman, he stated that he had mixed unleached wood-ashes with the poultry droppings. If he were to mix caustic lime with them the, result would be very bad; but in the wood-ashes the lime exists only in the state of a carbonate and is not caustic. I do not know that any really injurious results would follow the mixing of these ingredients. If the mixture did not lay for any length of time before applying it to the soil, it would be all right; but it should not lie long in a state of mixture, because a chemical change would then take place, carbonate of ammonia would soon be formed, and it is very volatile, and without any absorbent, would pass out into the air and be lost. If mixed and at once applied to the soil, no harm would ensue.

M. C. BEEBE, of Venango. How would coal-ashes do?

Prof. **JORDAN.** Its use would do little or no good. It is not an absorbent and could only be of value in making the manure more easily handled. It would add nothing of value to it and would not prevent possible waste of volatile portions.

J. D. **HICKS.** The remarks of Prof. Jordan as to the value of sifted coal-ashes, are in direct conflict with the experience of Dr. S. C. Baker and others. Dr. Baker says that the mixture was excellent in its effects, and that where he has applied coal-ashes alone he can see the effects to-day. He put it on the poorer portion of the field and states that the coal-ashes gave him good results. Here practice seems to be against science.

Prof. W. H. **JORDAN.** My remarks were directed to the value of coal-ashes as a manure. When applied to certain soils they have an excellent mechanical effect, but they certainly have no great fertilizing ingredients in them. They contain very little plant-food of any kind.

M. C. **BEEBE.** Would you not recommend the use of coal-ashes in preference to wood-ashes? Would they not be less liable to release the nitrogen or ammonia?

Prof. **JORDAN.** I would say, use the manure alone; mix neither with it. If anything is needed, let it be some good loam or road dust. To repeat what I have said, if the mixture is applied to the soil at once, no harm is done; but if it lays any length of time, loss will ensue to a certainty.

M. C. **BEEBE.** If plaster was mixed with them and the heap slightly moistened, would not the plaster absorb any free or volatile ammonia which might exist or which might be formed?

Prof. **JORDAN.** In connection with moisture, the plaster will prevent the loss of the ammonia. This ammonia unites with the sulphuric acid of the plaster, forming sulphate of ammonia, which is not volatile, and which will not pass off into the air. In this respect the plaster is the best thing that can be used.

Col. F. M. **ETTING** of Delaware. I would like to ask Prof. Jordan if kainite (German potash salts) would answer the same purpose and produce the same results as unleached wood-ashes.

Prof. **JORDAN.** If the land needs potash, there will be a benefit in mixing kainite, or cyanite, with the manure; but it might as well be applied separately, for it has no effect upon the poultry manure at all except to increase its bulk.

DAVID WILSON of Juniata. Would not sifted coal-ashes also absorb or hold the ammonia?

Prof. **JORDAN.** If you allow carbonate of lime in any form to lay with it for any great length of time, a decomposition of both will take place, and one of the results of this decomposition will be the formation of carbonate of ammonia, which is one of the most volatile forms which it can take; and in this form, unless a good absorbent is present, it is soon lost. I certainlly would not recommend coal-ashes as an absorbent; muck would be better.

Col. **JAMES YOUNG** of Dauphin. I have hauled out large quantities of coal-ashes every winter; on heavy clay lands they give me grand results every time.

Prof. **JORDAN.** That is altogether owing to their mechanical action. Then loosen the soil about as you would as much sand. If applied to a loose sandy soil, they would produce bad results, because they would make it still looser. You must make a distinction between the action of a substance as a plant-food, by which it enters into the plant as food does into the body, and its mechanical action, by which it merely loosens the soil to which it is applied.

H. M. **ENGLE** of Lancaster. This is an important question. I live in the vicinity of large iron furnaces, and we can readily obtain coal-ashes in considerable amounts. I have applied them repeatedly, and always with good results. My soil is not what would be styled a heavy one; nor is it, on the other hand, sandy either. In my experience good results always follow the use of coal-ashes. But there is another kind of ashes which collects in the flues of these furnaces, and which the farmers buy to leach for an alkali from which to make soap. It would seem to contain potash or other alkali, from the fact that it will make soap. I have applied it to potatoes, scattering it along in the rows, with good effect. Several years ago I applied it to my nursery grounds and to peach trees, both in the fall and spring, when we cut them back. The ground was porous and the trees made excellent growth. I have for years been of the opinion that this kind of ashes from the flues of anthracite furnaces has certainly more value than common coal-ashes; at least, more than from a scientific stand-point has been credited to them.

Dr. **JOHN P. EDGE.** My experience in the application of coal-ashes to fruit trees would lead me to suppose that they possessed some other value than that which results from their mechanical effect; something more in results than is due to the simple loosening of the soil.

J. G. **ZERR** of Berks. In regard to what Mr. Engle has said about the value of ashes from the flues of furnaces, I would say that in my neighborhood it is bought by the farmers. I have bought it at four different times in the city of Reading. I have applied it to my orchard and fruit trees with excellent results. It is deposited in the flues under the steam-boiler near the base of the stack.

Note by the Secretary.—Our space has only permitted of the insertion of a portion of the discussion which followed the reading of the essay of Mr. Hicks. As the substance of the whole discussion, it was evident that the Board recommended the adoption of one or the other of two plans: *First,* To allow the droppings to remain in the poultry house, and at regular intervals sprinkle plaster and dry soil over them in order to prevent loss by evaporation. The pile should be allowed to accumulate where it is dropped, until it is wanted for application to the crop. Sufficient dry soil should be

added to keep the pile moist and prevent it drying up, so as to render the application to the crop difficult. *Second*, To gather up the droppings at intervals and place them in tight barrels, being careful to cover each layer with plaster dry soil, or road dust. When ready for application, when dry it may be mixed with a varying amount of soil and allowed to lay until the whole is moist enough to crumble readily, when, by shovelling over a few times, the mixture can be easily and rapidly applied to the crop. Either of these plans will prevent loss by evaporation and attain the same end. No plan was proposed where the poultry are not kept under shelter, but it was decided that the increased value of the droppings from under shelter would soon pay for a roof; and that this would pay a large interest upon the investment and allow the laying aside of an amount to pay for the building.

THE CULTIVATION OF FRUIT FOR PROFIT AND PLEASURE.

By A. C. SISSION, *of La Plume, Pa.*

[Read at the Scranton meeting.]

The subject assigned to me on this occasion presents itself under two heads, viz: "The cultivation of fruit for *profit* and for *pleasure*."

We remark, first, that the cultivation of fruit for profit depends largely upon the following conditions: Suitable ground, a thorough knowledge of the business, both of growing and marketing, a sufficient amount of capital at the grower's disposal, and an unflinching determination to succeed. With these requisites, there is no doubt of a liberal margin for profits. That the markets are already overstocked with common fruit is apparent, and prices are hardly remunerative, while there is a steadily increasing demand for first-class fruit, both in home and foreign markets, at very satisfactory prices. It should, therefore, be the aim of the grower to produce none but the very best. To do this, as we said before, requires a thorough knowledge of every department of the business, with ample time to give constant attention to details. There must be a natural inbred liking for the business in the fruit-grower if he would overcome the numerous discouragements and difficulties that are constantly presenting themselves; to know how to successfully meet these requires much study and careful experimenting.

In the cultivation of fruit for profit, the grower should try to ascertain, if possible, what particular kind of fruit is best adapted to his location, and what he is best adapted to himself, and make that a specialty. There is more hope of success in this course than when a general assortment is attempted, especially where the grower has a farm to manage in connection with the fruit business.

It would be taking too much of your time to go into details in regard to starting in the business—the preparation of the grounds, the procuring of stock and, planting of the same. After culture, pruning, propagating, grafting, insect enemies, disease, (its cause and cure,) are subjects which require the closest attention. Avoid the tree-peddler and the professional grafter as you would a pestilence. Send your orders direct to reliable nurserymen and save the middle man's commission, and you are sure of getting what you order. If any grafting is necessary, do not employ men who charge eight or ten cents per scion, when you can learn in two minutes to do it yourself just as well as these itinerant experts. Never plant any of the tree fruits in sod ground or allow sowed crops among growing fruit-trees. Root crops may be grown with great benefit to the trees if sufficient fertilizers are used. Keep a close watch for insect enemies, always remembering that twenty-five trees well cared for will produce vastly more than one hundred neglected ones.

Having been engaged in growing small fruit quite extensively for nearly twenty-five years, and having made the strawberry a specialty, I have been requested to give our system of cultivation, and if the success that has attended our efforts makes our opinions worth anything, there is no reason why all who desire should not have the benefit of them; but there has been so very much said and written upon the cultivation of the strawberry for profit by experienced growers that I do not expect to tell you anything new in regard to growing this most delicious fruit. We will say, however, that during the twenty-five years of our experience we have made fewer failures than with any of the ordinary farm crops usually grown in this locality. With our system, we feel a great deal of assurance that a bountiful harvest will crown our efforts, unless untimely frosts, hail-storms, or some unusual circumstances entirely beyond our control intervene to cut short our expectations. I will, then, in as few words as possible, give in detail our method of cultivation.

The Selection of Ground.—While the strawberry will adapt itself to any kind of soil, it is better to use the best you have. Cool, moist, rather compact, clayey loam is the most natural. Steep hillsides and low, marshy ground should be avoided. The side hill will wash too much; low ground is more subject to late frosts.

Preparation of Ground.—It would be perfectly useless for me to attempt to tell these farmers how to prepare the ground for a premium piece of corn. They all understand that just as well, and perhaps better, than I do. We will say, then, proceed precisely as though you were about to raise from fifty to seventy-five bushels of shell corn to the acre. Plow, harrow, manure, etc., and, when it is all ready, plant the corn. Give perfectly clean culture the whole season; suffer no weeds to go to seed, and, as soon as the crop is harvested, plow into narrow lands by back-furrowing. In the following spring, as soon as dry enough, cross plow and harrow until it is smooth and made fine; then, with a one-horse plow, throw into ridges by turning two furrows together, three and one half feet apart. When you are ready to set plants, take a common four-tined potato-digger, and rake these ridges down to nearly a level, removing all stones and hard lumps. The advantages of ridging are two-fold: Should the weather be very wet, the ridges will keep dry; or, should the weather be dry, the ridges will keep moist and in fine order for setting. By this method, we have always obtained the very best results, using no fertilizer whatever other than that applied to the corn crop of the previous year.

Obtaining Plants.—This is a business by itself. The common slip-shod method of taking runners from old bearing vines is one of the most prolific sources of failure in the whole business, and no grower can expect to succeed very long who follows this method. Our plan is to set out good, strong plants early in the spring. Cut off all blossom buds as fast as they appear; also, cut off the first runners until the plants are well established. Give clean culture, and very strong, hardy, prolific plants in great abundance are the result.

Preparing and Setting Plants.—Use a spading fork for digging;

do not expose plants to hot sun or drying winds while out of the ground; trim off dead leaves, runners, and blossom buds; shorten roots to about four inches; make a hole four inches deep after the ridges above mentioned have been freshly raked; spread the roots fan-shaped, and press the soil firmly around them. Wet the roots as you set if the weather should be dry, taking care not to set plants any deeper than they were before. After care and culture, a "Planet Junior" horse-hoe is indispensable, and the very best tool in use. Keep it going the whole season as often as the ground becomes weedy. Hoe often. Cut all runners as fast as they appear.

We have found by experience that it does not take so much time and labor to hoe once a week as it does once in four weeks, and stirring the ground often is of great benefit to the growing plants.

Winter Protection.—As soon as the freezes come, we cover with forest leaves at the rate of twelve hundred bushels to the acre, and two or three tons of straw to hold the leaves from blowing away.

When warm weather comes the following spring, we go over the field and part the mulching just sufficient to let the plants through, and nothing further is done until the crops are ready for picking. As soon as the crops are harvested, plow the whole mass in, vines and mulching, roll, harrow and plant, sometimes, late cabbage, turnips, or fodder corn. When these crops are harvested, plow into narrow lands by back-furrowing, after the application of a quantity of well-rotted manure, and it will be in fine order for setting the following spring.

Then, to recapitulate, we say our whole system in a nut-shell is simply this:

Good ground, well manured by applying to some previous crop. Use rank, unfermented fertilizer.

Good plants, set as early in spring as it is possible to prepare the soil. Clean culture, with runners kept closely cut the whole season, with heavy winter protection, to be left until the crop is harvested.

This insures a bountiful crop of clean, delicious fruit. We do not consider irrigation necessary or practicable when possible. Too much moisture makes soft, poor-flavored fruit. We prefer a berry of smaller size, with rich flavor, to the larger ones that are insipid and tasteless.

Amateur growers in towns and cities usually make the fatal mistake of planting their vines near or under trees, which absorb the moisture and obstruct the sun's rays, both of which are absolutely necessary in growing strawberries to perfection, and there is often too much humus in the soil, the result of long-continued application of manure. A rank growth of foliage is produced at the expense of the fruit. It would be a paying investment if our city people would have a few loads of soil from some pasture-lot to mix with their garden soil. It would be worth more than stable manure for raising strawberries. The same general directions will apply to after-management by amateurs, as by the larger growers.

We have selected the following words as the foundation for what we have to say under the second head of our subject: "But if any provide not *fruit* for his own, and his own house, he hath denied the faith, and is worse than an infidel." We remark first: It may be optional with us whether we engage in the cultivation of fruit for profit or not; but the cultivation of fruit for pleasure is obligatory upon every man owning or controlling a single acre of ground. We owe it to ourselves, our families, and friends, to make our homes as pleasant and inviting as our circumstances will possibly allow. No country home can be said to be complete that has not a well-cultivated fruit garden attached.

When man was created, he was placed in a garden, "and every tree in which the fruit of the tree yielding seed was for his meal," and it was not until after the fall that he was driven out, and compelled to till the soil, "and in the sweat of his face eat bread."

If we would return to that state of primitive happiness enjoyed by our first parents, let us imitate their style of living, and provide at once a bountiful supply of health-giving, soul-inspiring, nerve-invigorating fruit.

It is perfectly surprising to see the possibilities that are in easy reach of every owner of only a very small farm, and to see how many farmers there are who pay very little attention to this subject. From one fourth of an acre of ground, a family of six persons can be supplied with fresh (not preserved or canned) fruit every day in the year, and have some to divide with the poor, and visiting friends. If people would partake more largely of fruit, there would be no need for a physician to every hundred inhabitants of our land.

Are you scrofulous or rheumatic? Eschew hog and eat fruit. Have you torpid liver, dyspepsia, or any kindred diseases? Partake more freely of fruit. The rich, sprightly vegetable acids contained in our fruits would be an almost unusual panacea for the ills of which we so much complain, if we were from childhood allowed their free and habitual use. Would you make your home a rendezvous for your friends and acquaintances, and make it an inviting place even for strangers who may chance to pass by, to call and look over your grounds? Would you make all who come to your home feel happier, more cheerful, and place a higher estimate upon human character? Then have a bountiful supply of delicious fruits to set before them, and bid them partake freely.

"But," says one, "I can't afford to raise fruit to give away to my neighbors and friends. It is hard work to get along now. It takes all I can get to pay taxes and necessary expenses." To such I will say, upon the authority of Holy Writ, "That the liberal soul shall be made fat;" and you have no right to doubt the truth of this statement until you have tried the experiment.

The average farmer needs better social advantages. He needs to be brought more frequently in close contact with the people of culture, the professional men, and all worthy citizens of neighboring cities, who so much enjoy a drive out in the country. Invite them to call. Make their acquaintance. Converse freely with them. You will learn something that will amply repay you for all the time you have spent in entertaining them. Take them out into your fruit garden; invite them to partake freely. They will always want to buy some to take home with them, and while you are making them happy you are advertising your business, and you have the satisfaction of feeling that you have, in a measure, exemplified the beautiful sentiment contained in the Golden Rule. I will relate a single incident to illustrate my point: A gentleman and lady from the city, with whom I had but a slight acquaintance, called at our humble home. They were invited to call and walk over our grounds; to partake of the fruits then ripe. We tried to make their short stay with us pleasant. When they departed, their expressions of delight were of a very pronounced character. We found them to be social, conscientious, and agreeable, and from this visit an intimacy sprang up that soon ripened into friendship, sincere and reciprocal. Their visits continued until the failing health and subsequent death of the estimable lady brought them to a close. But we shall ever look back to them as among the green spots that have dotted our pathway through life.

I can say from experience that farmers greatly need the advantages to be derived from more extended social privileges.

Let us try, then, to make our homes more inviting by surrounding them with every variety of fruit that grows in this climate. Assist the good wife in cultivating a choice selection of flowers. Extend your acquaintance by inviting worthy people to help you enjoy these luxuries. It may take a little of your time, but the result will be of greater pleasure and satisfaction than a like amount of time spent at ordinary farm work.

Would you keep the boys at home and make farmers of them? If so, make the home so pleasant that they will not think of leaving it; and we know of no better way to do this than to plant at once a model fruit garden.

A man will think more of his home, will have more enthusiasm for his own country. He will not want to sell out and go West. He will be a more useful man in society; be better in every way—more benevolent, less selfish; and, when he sees the bountiful crops of delicious fruit that are sure to come as the result of a well-directed effort, he will find his heart going out in love and gratitude toward the great Giver of all good, and toward his fellow-man. He will want to invite all his friends to come and enjoy the luxuries with him. Let the words of Leigh Hunt inspire us in our work of love to our fellow-men:

"Abou Ben Adhem (may his tribe increase!)
Awoke one night from a deep dream of peace,
And saw, within the moonlight in his room,
Making it rich, and like a lily in bloom,
An angel writing in a book of gold.
Exceeding peace had made Ben Adhem bold.
And to the presence in the room he said,
What writest thou?' The vision raised its head,
And with a look made all of sweet accord,
Answered, 'The names of those who love the Lord.'
'And is mine one?' said Abou. 'Nay, not so,'
Replied the angel. Abou spoke more low,
But cheerily still, and said, 'I pray thee, then,
Write me as one who loves his fellow-men.'
The angel wrote, and vanished. The next night
It came again with a great awaking light,
And showed the names whom love of God had blessed,
And lo! Ben Adhem's name led all the rest."

After the reading of the essay of Mr. Sission, the subject of general fruit-culture was, at the suggestion of the President, (Hon. R. E. Pattison,) opened for discussion. Our space forbids the insertion of this discussion entire, but we here present the following condensation of it. The compulsory condensation gives to the discussion a disjointed appearance for which the speakers are by no means responsible.

At the request of the President, Mr. Sission exhibited a basket of very fine strawberries, and thus alluded to the qualities of some of the varieties shown:

A. C. SISSION, La Plume. This (exhibiting a sample) is the celebrated Sharpless Seedling, which, with me, grows enormously large. It is not well adapted to distant markets, and must be picked at precisely the right moment, in order to have it retain its peculiar flavor. If left on one day too long, they are, comparatively, tasteless and worthless. They are good berries if well matured, and not good if picked too soon. I do not recommend them for market purposes.

Here (exhibiting a specimen) we have the Longfellow, the best table berry, and one which will keep ripe the longest of any variety with which I am acquainted. It is "early ripe," and keeps longer on the vine than most varieties. I have picked berries in August. These are the first berries that I have picked, so that we may say that it lasts two months. The flavor is very similar to that of the Wilson. The flesh is a deep crimson. It is a good table berry.

Here I have the Wilson's Chief, one of the most prolific berries with which I am acquainted. It gives the largest amount of berries with the least foliage of any kind that I know of. It is one of our very best canning berries, but quite tart.

This is the Manchester. They are not quite ripe. They are uniformly large and uniform in shape, and, while not of the highest flavor, yet you can get more quarts from them than any variety with which I am at present acquainted.

Dr. H. S. COOPER. I have some that bear now, which I got of you, that are called the Cumberland Triumph. I incline to the opinion that they are the best variety that I can produce.

A. C. SISSION. With regard to the Cumberland Triumph, I would say that they are a good variety to raise in a small way, but unless, like the Sharpless Seedling, picked at precisely the proper time, they are comparatively tasteless. Beside this, I do not find it nearly so prolific as some other kinds—that is, all under the same treatment and on the same soils.

W. H. JESSUP. How many acres have you under cultivation, and what is your average product per acre?

A. C. SISSION. We have two acres in bearing this season. Last year we had one and three quarter acres. Eight thousand quarts were harvested from one and three quarter acres last year; some of the patch was, however, two years old. The best yield that I have had was seven thousand eight hundred quarts to the acre. I consider five thousand quarts a good yield per acre.

C. C. COURTWRIGHT. Of all that you have named, or that you have in cultivation, what is your favorite berry?

A. C. SISSION. For table use, I would choose the Longfellow. I have the James Vick, which takes the name of an illustrious fruit-grower. It has been lauded, perhaps, higher than any other berry now in the market. I bought it with a great deal of assurance, from the fact that well-known growers recommended it. But I find it to come short of the claims. It gives plenty of blossoms and green fruit, three fourths of which it cannot possibly mature. It attempts too much—more than it can accomplish. It will ripen a few good berries of moderate quality only.

Mr. COOPER. I am indebted to Mr. Sission for what little I know of strawberry culture and varieties. The Cumberland Triumph should not be passed lightly by. I was yesterday picking some of them, but I find that it is (when ripe) too tender for shipping a long distance. But for my own table, or for those who raise berries for home use, do not fail to plant some Cumberland Triumph. The Sharpless is very handsome, but the Cumberland will exceed it with me.

J. A. HERR of Clinton. I would like to ask Mr. Sission whether, in recommending varieties as he does, he should not take into consideration varieties in soil and climate?

A. C. SISSION. Certainly we should, but I am speaking of my own soil and climate. I have alluded to heavy mulching. You will find that this will completely revolutionize the cultivation of strawberries on sandy and loose soils. This berry requires a moist soil. On bare, sandy soils, it gets too hot and ripens too soon. If you cover the soil deeply, you may double the size of your crops. The Cumberland (with me) does best on sand and the Longfellow on clay. If you expect to succeed with the Cresson, you must carefully cut the runners away, otherwise it will prove a nuisance to you. If they are kept cut back, it is a good berry to grow. It takes less time to cut off the runners than it does to pull out the weeds from wide, straggling rows.

J. A. HERR of Clinton. My first experiments in strawberry culture were in New Jersey, with sandy soil. When I began to raise them in Pennsylvania, I found that the same kinds and the same treatment would not meet with the same success here. I sent to Pennsylvania for the Sharpless, under the impression that it was a strawberry which thrived well, and, while it has not borne the quantity of fruit which some other varieties do, it has done well with me. My desire was to call out the views of Mr. Sission in relation to varieties under different soils and treatment. I was fearful that some here, knowing the practical nature of his remarks and his ability to give practical advice, might go away under the impression that the Longfellow was the best berry under all circumstances, but Mr. Sission has fully explained that.

A. C. SISSION. In purchasing for experiment, it will not take long to determine the effect of your soil upon any berry. In regard to new varieties, I have been much annoyed by over-praise of some varieties which really had nothing to recommend them to the practical grower who grows for money return. In testing new varieties, I usually send for a few plants—six to one dozen—and try them under different circumstances, carefully noting the result. When the Sharpless was first sent out, I got six plants for one dollar. I hardly dare tell you how many I got from those six plants. One plant I set near to the house, so that I could attend to it carefully. The succeeding April I took up from it five hundred and twelve good strong plants, besides many which did well, but which I did not consider worthy to be called plants. The others I set out nearer together, but they did not produce in the same ratio. These five hundred and twelve plants were worth seventy-five dollars at the then market rates. If we had bought one hundred, I should have probably done in the same way. I did not raise them as much to sell as to see what I could do with a single plant. With the Manchester I obtained about one hundred plants from one set out. I got so many that I could neither sell nor use all of them.

Secretary EDGE. Are not new plants often misjudged by one or two specimens thus purchased at a high price and given extraordinary treatment?

A. C. SISSION. Yes, sir; that is often the case, and the result is used to advertise the berry, to the disappointment of the purchaser.

Mr. COOPER. I cultivate the Manchester, Longfellow, Wilson, Cumberland Triumph, and the Cresson, all in one patch in my garden, and find them all good berries. My soil is a stiff clay, and I contend that much of the success or failure of any variety is in the soil and manner of cultivation. Different soils will give very different results from plants taken from the same plot originally.

Note by the Secretary.—It was evident from the discussion that the quality and quantity of the fruit depended upon several conditions, among which we may enumerate the following: Differences of soil and climate; difference in situation with reference to sun and light; difference of season in the production of large amounts of foliage which shelters the berries, retarding ripening, or the absence of this foliage, which quickens the ripening, and also increases the sweetness of the berry; variations of season as to amount of rain-fall and moisture, some seasons producing much better and highly flavored fruit from the same patch. It was also agreed that the absence of mulch had much to do with the quality and size of the berries, and that on sandy soils it was almost indispensable to a good yield of high-flavored fruit; that it is not safe for any one to set out a large plot, even upon adjoining farms, upon the results of the experiments of a neighbor; that it was by far the safest plan to experiment upon a small scale first, and let the after-work depend upon the result of these experiments alone, rather than upon the advise of some one who may not produce the crop upon the same conditions; that a difference of but a short distance may, under the same treatment, give entirely different results, and that a variety may give different results within one hundred feet.

GYPSUM AS A FERTILIZER.

By the late Hon. M. C. BEEBE, *member from Venango.*

[*Read at the Towanda meeting.*]

The use of gypsum upon crops to enhance the growth and production has many strenuous advocates. By others it is condemned, not only as useless in itself, but finally absolutely injurious to the land, and tending to impoverish it. These different conclusions have been arrived at by the different methods of use of the articles, and, in my judgment, the latter conclusion has no warrant whatever, but is born of ignorance and thriftless methods in use, not only in relation to the article under discussion, but in the methods of farming generally, which lead to disaster and poverty; and in the use of plaster, these invidious deductions are drawn from the application of fifty or one hundred pounds of plaster to the acre one year, and the expectation that a similar result will be obtained the next year without any further application of the material, or an application where certain existing conditions will render it valueless, such as to old sod-bound meadows, or, in a dry season, at so late a period that the effect is not perceptible on the crop, or other similar reasons.

The principal ways in which plaster affects vegetation are its effects in absorbing ammonia, attracting and holding moisture, and by supplying sulphuric acid—an important ingredient, particularly in seeds of plants—and, perhaps, in combining with some of the salts of the earth, particularly alkali. I have said in my opinion, because all these are, more or less, disputed points, and I do not pretend to be wiser than what others have written, but, at the same time, chronicle my own conclusions from long use of gypsum, and close observation as to its methods, if I may be allowed to use the expression.

Here again I speak from close observation of practical tests, and first among these is its application to clover, either as a new seeding or any period thereafter. That it has often made a successful catch of clover seeding, where otherwise would have been a partial failure, rendering the attempt an unprofitable one, I have not a doubt, having solved it by actual experiment on the same field and at the same seeding, as also upon fields already in clover. It has also proved a valuable 'application to leguminous plants, as well as corn, potatoes, oats, buckwheat, garden vegetables generally, and new meadow. In connection with this, I might here say that by far the most extensive, and, in my opinion, valuable use I make of plaster is its free and frequent distribution in the stable, and as a valuable adjunct to the manure heap. In addition to the foregoing, I consider plaster valuable as a disinfectant, and a protection from vermin. Therefore, keep a free supply distributed, not only on the manure-floor, but upon the walls of the stable and hennery.

On clover and meadows, one hundred and fifty pounds broadcast sowing is sufficient to the acre, and may be generaly applied again to advantage in lesser quantities, say one hundred pounds after sixty days, and in all cases should be applied as soon as the spring leaves start. With the several crops and seeding for meadows, I sow with the seed-drill as a matter of convenience, and believe with as much utility as any other method of application. Apply it on corn by dropping a small handful on the hill. On potatoes, by broadcasting twice during the season, which not only advances the growth, but if sown when the potatoes are wet, will largely preclude the ravages of the potato-bug; but to make sure of the latter, I suggest the admixture of one pound of pure Paris green to one hundred pounds of gypsum. I will here add the most marked result of the use of gypsum I ever witnessed. A neighbor purchased a farm near me, which, by thriftlessness, had in part been impoverished till it would produce no crop without manure applied. Of this farm he plowed four acres for buckwheat, with an intent to apply two hundred pounds of phosphate to the acre to get a crop and a catch of clover. His stock of phosphate failed on the third acre, when, to fully test the merits, he sowed a strip without phosphate; then, taking two hundred pounds of plaster, he finished the last acre by drilling in same as the phosphate. Now for the results. He obtained a fair crop of buckwheat and good catch of clover where phosphate was used, and equally as good where plaster was used, and nothing worth harvesting or mentioning where neither was used. This was a test of value, both of phosphate and gypsum, but at what a difference in price—the phosphate thirty-eight dollars per ton, the plaster five dollars, delivered in bulk by the car-load.

It may be easily inferred from what I have already written, that my idea of an application to cereal crops is from one hundred to two hundred pounds per acre, unless put in with drill in sowing time, when I would make it from two hundred to two hundred and fifty pounds. I would not deem five hundred to the acre too much if applied twice, as it certainly should be, to potatoes and sowed corn. In short, I believe an ordinary farm—say from one hundred and fifty to two hundred acres—could to advantage use a car-load of gypsum yearly. The average car-load is ten tons. This, of course, includes its use in the stable buildings, upon which I have heretofore commented, but would again urge its use in that form as the most valuable.

And this will suggest itself as a matter of as much importance as any part of this article, and, as an illustration, will briefly mention our way at home. We buy the car-load in bulk, delivered at the nearest railroad station—freight rates secured in advance by the company selling—from which each farmer, on a given day, takes his supply, generally bringing barrels, or coming with a tight box, to take his supply home. This includes buying at wholesale rates, but also includes cash payments. One or more car-loads, according to the demand, are then ordered at a time—never less.

The great hindrance to the more general use of plaster is the freight charges. The railroads might take a note of this to advantage, especially in the time of scarcity of business.

The State Board, by securing the fertilizer law, has benefited the farmers beyond conception, without an investigation by facts and figures. In my own vicinity, samples of the different kinds, procured at the time of the passage of the law, averaged but twelve and one half per cent. of pure gypsum. It is not at all difficult now to buy stocks that average from eighty to ninety-five per cent. Indeed, none others can now be found in the market, to my knowledge. Let any one make a computation of cost, time, and labor, and apply the result to the average amount of gypsum and phosphates used in the State, and they certainly cannot believe the State Board has been profitless to the interests of the State, or recreant to its trust.

Dr. E. HARVEY of Delaware. I should like to add a few statements, which I believe to be the result of experience. A practical farmer told me, many years ago, that plaster paris had been very popular, and farmers saw great benefits from its use; that it afterwards became unpopular because the theory prevailed—I fear, without proper basis—that it impoverished the soil. He stated that the dust would, by blowing over into the next field, demonstrate that a light application was as beneficial as a heavier one. He further told me that Joseph Pennell, a Chester county farmer, followed up the use of plaster after others had relinquished it, and always obtained good results from it. His plan was to apply the plaster heavily, and let the land lay in grass for a number of years. In Chester county, the Brandywine lands are often left in grass for fifty years, and, in fact, some of them have never been plowed since the memory of those now living. My father stated that he found that reasonable applications of plaster benefited his crops, and that he could readily see by the appearance of the crop, and by the yield, what portion had been plastered and what had not. I have often wondered if farmers could give any good reason for the very general abandonment of the use of ground plaster. Is it any more beneficial to the lands of Chester and Delaware counties than to those of Bradford? Can any one give any good reason why it should not prove as beneficial to crops now as formerly?

J. G. ZERR of Berks. I am myself a great believer in the use of plaster, and I am well satisfied that, taking one year with another, its application has paid me very well, and quite as well as our commercial fertilizers. I use from two hundred to three hundred pounds per acre, and would not approve of any smaller amount. I sowed it at this rate on a twelve-acre field, and left a strip on each side of the field without any application. When mowing time came, the portion of the field to which it had been applied gave a heavy cutting of excellent grass, while that portion without the application did not yield one fourth as much. The naked eye, on the opposite hill, could readily detect the great difference between the two portions and the line could be distinctly traced through the whole field. My father was a great believer in the use of plaster, and taught me to use it and I have continued to use it up to the present time, with great benefit. I am positive that, on an average, it has paid me one hundred per cent. on the investment and labor of applying it.

Dr. E. HARVEY. Did you ever notice that the application is more beneficial during a wet season than a dry one?

Mr. ZERR. It will always produce more effect during seasons of plenty of moisture, and will show its least results during a dry season. If the latter portion of the season is moist, it will also show good effects upon the second crop of clover.

H. M. **ENGLE** of Lancaster. I can readily remember when the sowing of plaster was almost universal in my neighborhood, but for some unknown cause it is not now used to any great extent. As soon as our farmers commenced the general use of lime, the plaster was given up. Lime has now materially fallen out of use, but the use of plaster has not been again resorted to. I know of no reason why it should not prove as beneficial as formerly, but our farmers do not seem to make any use of it recently.

Col. V. E. **PIOLLETT** of Bradford. It is now more than fifty years since I first went to the plaster beds of Cayuga lake, in New York, by sleigh, in winter time. Forty years ago, I sent plaster on a raft to Harrisburg and points down the river. I have used as much as seventy tons of plaster in a year, but we have not limed as they have in Chester, Delaware, and Lancaster counties. I have sent one hundred and fifty miles for it, at a cost of twelve and one half cents per bushel, and I have never seen it applied anywhere that it did not show a beneficial effect. Several years ago, I sent to Dauphin and Lancaster counties several tons of our lake, or blue plaster, to be tried side by side with that from Nova Scotia. At that time, fertilizer manufacturers purchased a considerable amount, but they preferred the lake plaster, because it did not affect the color of their fertilizer as did the white plaster of Nova Scotia. I used to go to Cayuga lake and get a barrel of salt and a ton and a half of plaster at a cost of sixty-two and one half cents. We paid six and one quarter cents for our lodging, and six cents for our horses; sixty-two and one half cents was all the money outlay for that amount of plaster and salt. This will show what was necessary at that time of my life, and I had something to do with the improvement of the county in which I live.

H. N. **WILLIAMS** of Bradford. I live in Troy township, and have had some experience in the use of plaster. We used to haul as much as thirty tons in a single year. My neighbors did not consider it a paying investment. The farm came into my possession about fifteen years ago, which had previously been rented for about thirteen years. I leased it to another man, and put stock on it. The first year I was compelled to buy ten tons of hay to carry the stock through the winter. My tenant was very slow about laying out money, as many tenants are. I purchased a ton of plaster, which the farmer sowed on one of the worst grass fields. That season we had twelve tons of hay from the field, and I estimated that I obtained one hundred dollars' worth of hay from the effects of that ton of plaster. On the farm on which I now live there is a thirty-acre field, which is divided by a stream of water—one side being of a loamy nature and the other being red shale land. On the clay loam the plaster produced apparently but little effect, but I have never applied it to the other side without excellent effects; nor do I find that it has the same effect upon clover and timothy sod which has been mowed for several years.

Mr. **ELSBREE** of Bradford. I would like to have the experience of the farmers of Bradford county as to the practical benefit of the use of plaster. Through the kindness of my friend Piollet, I last winter purchased fourteen tons of plaster, and distributed it over different portions of my farm, some with the hand and some with a shovel, and I have yet to find that I have been benefited one cent. Whether it is the fault of my land or not I do not know; it is what is known as a hard pan and shale land. The application was made two years ago this summer; I put on fourteen tons, and cannot say that I have received any benefit from it at all.

Dr. E. L. **STURTEVANT**, New York Experiment Station. There is no agricultural difference between Nova Scotia plaster and that of New York State; the Nova Scotia plaster is white. One theory of the action of plaster is that it releases potash from its chemical combinations in the soil. However, the whole question, in its practical application, has not yet been determined by science, and we can only say at present that the only way to ascertain what plaster will do for us individually is to try it for ourselves. In one field it may give good results and in another fail; in one section it may be found beneficial and in another it may prove unprofitable. The question is one of those which we cannot discuss profitably, for each one must try it for himself. It is one of those seeming paradoxes which, according to the testimony of men of experience, a small amount of it applied to the acre will show as good results as larger applications. My allusion to the potash theory was not for the purpose of indorsing it, but simply to bring it to your notice.

Col. V. E. **PIOLLET**. Does not the plaster absorb the nitrogen in the atmosphere?

Dr. E. L. **STURTEVANT**. We have no definite data by which we are enabled to assert that the plant can absorb one particle of atmospheric nitrogen. We know that the upper portions of the soil are richer in plant-food than the lower portions. We know that nitric acid and its salts are washed through the soil with the soil water. This fact, at first thought, would lead us to think that the lower layers of the soil are richer in nitrogen than the upper portions. The reverse, however, is true, and indicates that nitrogen is being formed in the upper portions of the soil. Something lately ascertained by science is that a bacteria-like organism in the soil takes upon itself the province of converting organic matter into nitrogen compounds accessible to the plant, and some experiments seem to show that when the soil has been sterilized or is barren, or, in other words, that when this organism has been killed, barrenness follows. By and by our papers will be full of accounts of this new theory, and it is possible that our present theories of soil nitrogen and atmospheric nitrogen may have to

be reformed under its influence. I will, however, say that dry plaster does not fix ammonia; that chemical action only takes place in the presence of moisture. Dry earth will absorb odors, and for this purpose may replace plaster.

GRAPES FOR THE FARM GARDEN.

By J. R. TOWNSEND, *Bloomsbury*, *Pa.*

(Read at the Bloomsburg meeting of the Board.)

I do not propose to give a long, or attempt to give a learned, essay on this subject. I do not propose to trace the origin of the grape, as we all know it is one of great antiquity, and a fruit that is, at present, extensively grown throughout the civilized portion of the world, and there is, probably, no branch of horticulture, at the present time, in the United States which is receiving so much attention as the cultivation of native grapes, while the large increase of acreage in some of our States shows that the cultivation of the grape is fast becoming a source of great wealth, and it is one of the principal features of this essay to draw the attention of my farming friends to the advantage that may be derived from the cultivation of grapes in the farm garden. I simply propose to give the result of several years of experimenting with different varieties of the grape, in order that varieties of grapes may be planted that are suited to our county, and that my friends may plant grape vines that they can rely will produce fruit to perfection. On many occasions, while traveling through our county, I have frequently observed a very much neglected portion of some well-cultivated farms and that portion was the farm garden, a part of the farm that is so closely connected with the domestic part of the farm that it should by no means be so neglected.

I will not attempt a description of the usual farm garden, but only state that, from frequent observation, I have noticed the entire absence of grape vines, and when, by chance, they are found in the farm garden they are mostly of an inferior variety, or in a very neglected state, producing very little fruit, and being, in fact, of no profit to the farmer.

During a period of several years, I have devoted my leisure time in cultivating grapes, and I have obtained considerable practical information, from repeated experiments with different varieties of grapes, until I think I am in a position to tell my friends what varieties of the grape are most profitable and suitable to our county. At our county fair I had on exhibition nine varieties of grapes, each one, or all, of which I can confidently recommend as being profitable to raise, and for the benefit of my friends I will give the names of the different varieties. For early grapes, I find the "Early Brighton" and "Moore's Early" are unsurpassed, both of them being thrifty growers and prolific bearers of fruit. I have also grown and tested several of "Rogers' Hybrid;" they are strong growers and are not subject to mildew like the slow-growing varieties. I find the "Agwam," or "No. 15," excellent, and for beauty of cluster and flavor of berries can hardly be excelled; while the "Salem," a hybrid between the native and "Black Hamburg," is pronounced by the best judges who have tried it to have no equal among the numerous varieties now before the public. There are many other varieties of "Rogers' Hybrids," all of a different flavor, and each possessing merits the other do not.

The "Hartford Prolific" I find very good, vines are vigorous and exceedingly productive. The "Martha," a pale, yellow berry, a seedling of the "Concord," but ripening earlier, and better in flavor, I have grown with great success; and last, but not least, the "Concord." Of all grapes I do not know of any that can equal the "Concord." It is a sure and safe bearer, easy of growth, hardy, vigorous, and productive, and less disposed to mildew than any other grape I have grown. Suitable for the table, or as a wine grape, it may lack in flavor, but, as a prolific bearer, I have never grown a grape to equal it. When some other of my varieties may fail, I can always rely on the "Concord" for grapes. As wine grapes, I find the "Bacchus" and the "Clinton" are among the best, being extremely prolific, and making an excellent wine.

While the grapes mentioned by me are varieties that are noted for their excellent qualities, I do not wish to detract from the merits of many of our new varieties that are constantly being introduced by our grape-growers, such as the "Jefferson," "Lady Washington," "Niagara," and many others.

My farming friends may tell me they have no time to spare on grape vines. Let me tell them there is very little time required to grow grapes; almost any soil is suitable, if not too wet, and there are few fruits that require so little care, and that give such widespread enjoyment as does the grape. Vines can be grown within half a foot of a fence or building, and many a corner and unsightly spot can be made to produce grapes, and the little attention that is necessary is at a season of the year when the farmer can do very little farm work, while the summer care of grape vines is one of the most pleasant occupations for ladies or other persons who cannot perform the heavier duties of the farm.

Hygeinists agree in pronouncing grapes as among the best of fruits. The grape possesses several rare qualities; it is one of the most nutritious of fruits for those in health, while physicians frequently prescribe it to the invalid. Let me assure my farming friends that grapes should be on the table as often as they can be procured through the season, and not merely on special occasions, but as an article of food that is wholesome and nourishing.

I have now told you what to plant in the farm garden, but time will not permit me, on this occasion, to enter into any details as to pruning and training the vine, or as to the merits of the different systems adopted by grape-growers. In conclusion, let me urge my hearers to plant out a couple of dozen grape vines in the coming spring, and I think you will find that, with care, this delicious and healthful fruit will amply repay for the outlay in the farm garden.

The President (Hon. R. E. Pattison) having declared the subject open for general discussion—

Col. V. E. Piollet of Bradford. Will the gentleman please give us his mode or rule for pruning the grape?

J. R. Townsend. The method which I have given may not be the best one, and I should prefer to have the question answered by some member of the Board.

H. M. Engle of Lancaster. Many seem to think that there is some great mystery about pruning the grape vine; and we are often appealed to for "your plan," as if there was something special or mysterious about any plan or mode. When we plant the vine we let it grow a single stem the first season, and either train this to a stick or let it trail on the ground. From this we grow not less than two stems during the second season and these we train on a trellis or on poles. The third year we still train on poles or trellis. Many vines in vineyard culture are successfully grown on stakes or rough poles by tying them up as they grow; in this way they can be planted quite closely and made to bear abundantly. Do not forget that all fruit grows on the new wood of last year's growth, and pruning is simply to get shut of too much of this wood, which, if left, will allow the plant to overbear. It is a great mistake to leave too much wood or too many eyes. An intelligent and experienced grower can count his bunches on the vines when he prunes them; and every year he will, practically, make a new vine; each year he will make a new vine which will bear from two to four bunches upon each branch or stem. If you leave too many eyes, you will have too much wood and more fruit set than the vine can perfectly proper or fully; in this way you overtax your vine; the most common error is overbearing.

Col. V. E. **PIOLLET**. How high would you train it on stakes?

H. M. **ENGLE**. That must depend upon circumstances; along a building you may train as high as you please and still have room; but must always cut back the last year's wood to two or three eyes. The vine can be grown without difficulty by any one having a little ground and the crop will prove more certain than any other; they grow more readily than any other fruit.

As to varieties, the essayist did not name all of the valuable kinds. There are other varieties which can be grown quite as successfully as those which he named. For instance the Catawba on the lake shore of our State is most valuable, and where successful should always be planted. In some places they will not mature well, and in others mildew badly; the Concord is, of course, our standard variety; there are a few new candidates for public favor which are now attracting some attention; there is a seedling of the Concord which it is claimed is a little earlier and larger in the berry, which I think has come to stay; as to the Rogers' Hybrids, a difference of opinion exists; during the past few winters, many of them have winter-killed badly, but when protected by removing them from the trellis and laying on the ground they have done well; they are as certain bearers as any and none are better; we have one of the Rogers' Hybrids which comes nearer the common grape than any.

Col. V. E. **PIOLLET**. The Catawba grape is a good one to eat; what have you to say about it?

H. M. **ENGLE**. It is an excellent variety, but it is not generally successful for miscellaneous growth, where it can be fruited it is excellent. Be sure to prune close enough and you will get better fruit and not injure the vine by overbearing.

J. S. **KELLER** of Schuylkill. How many bunches would you leave to the vine—how many eyes?

H. M. **ENGLE**. That depends upon the strength and vigor of the vine and somewhat upon the variety and situation; a good, healthy three-year-old vine may bear a dozen bunches or even fifteen, as it gets older it can of course bear more.

J. S. **KELLER**. On a vine of one year's growth, how many bunches?

H. M. **ENGLE**. It should not bear more than three or four at most, but it is better to have too few than too many; the plant may be injured by overbearing the first year and may not recover for years afterwards.

J. A. **HERR** of Clinton. I have been in the habit of pruning my own vines without any instruction of any kind except what little I have gathered from practical experience and from reading. I follow the plan described by Mr. Engle, of pruning according to the strength of the vine; I leave two or three buds to each stem, according to the vigor of the vine. When we remember that this year's fruit grows only on last year's wood, pruning becomes a very simple matter, and could be done by any one with good sound judgment. Do not leave too much of last year's wood when you prune, not more than three buds. A friend of mine employed a German to prune his vines scientifically. The man came along as a tramp and his attention was called to the vines, and he offered to prune them properly for twenty-five cents each. Going out to inspect the vines, my friend found that the German had cut them off close to the ground; but it turned out that he had perhaps done the very best thing under the circumstances. The vines had been very much neglected and the next year after this severe cutting back, they made good healthy wood, and the second year produced a good crop of grapes. My friend only lost a year unnecessarily.

As to varieties, I have been somewhat of an amateur grower for a number of years and have tried many kinds, some forty or fifty at least. Once and a while I am asked the question, "I want you to tell me what you think to be your very best grape." It is inconsistent to ask a grower as to his best variety. That which is best in one locality may turn out very poorly in another; what may stand the winter well with me may not do so in another situation. If you give a man a luscious grape and it bears for him two or three years with but little success, he will probably blame you, whereas another might have taken the same vine and made it a perfect success. I have had some success with the Delaware, but it needs a good deal of attention to grow perfect clusters.

G. **HIESTER** of Dauphin. When I want to send out a man who has but little judgment to prune grape vines, I say to him, "Go over the vine and cut off every bit of the new wood on each branch but two buds." When he has proper judgment, he will probably in some cases leave three or four buds on. The old buds which bore last year make up the new wood for the next year. I only leave two canes on each spur. These two canes probably bore two or three bunches last year. These we cut back to two buds again, and there will shoot out new branches of clean wood and bark. The shoot which they made last year is cut back to two buds and if these come within six inches it is taken off entirely.

J. B. SMITH of Luzerne. Some time ago, while going to Washington, I saw a grape vine trained in a way which suited me and which I have since followed with good success. The vine was planted in the middle of an arbor ten feet square at the ground; that is, the corner posts, which were about thirty feet high, were set in the ground so as to form a square ten feet on each side with the vine in the middle. From the top to the bottom of these poles, at intervals of about two feet, strong cross slats were securely nailed; the trellis or arbor was about five feet wide at the top, and there was no trouble in getting at every branch either to prune or pick the fruit. A still better way is to make the trellis in the same way, and plant a vine just outside of the slats and at the middle of each, thus allowing four vines to each trellis. Since I have adopted this plan I have had all the grapes I want. The pruning may be done exactly in the way which Mr. Engle has described, and each branch is easily got at either from the inside or outside of the trellis, and you can have as much wood as you want or you can cut back to two eyes each season. If your vines will bear more, you may leave them. You can regulate it exactly to please yourself and can experiment to suit yourselves or any theory you may adopt.

Dr. J. P. BARNES of Lehigh. Does the gentleman from Lehigh prune his vines, and if so, how?

J. B. SMITH. The situation of the vine upon this sort of an arbor will enable you to get at each part of it readily. In pruning I leave one or two eyes on each shoot; that is, I cut the new wood back as Mr. Engle and Mr. Hiester have described.

QUINCE CULTURE.

After the reading of an essay on "Quince Culture" by Dr. James Calder, the subject having been declared open for discussion—

M. W. OLIVER of Crawford. The essayist has stated that the soil for growing quinces should be a dry gravelly one. Is not this at variance with the general theory and practice in setting out quinces? I know that in the State of New York and through our own vicinity, in growing dwarf pears we select a heavy clay sub-soil. I know further that in some of our Eastern States, when they attempt to grow dwarf pears and they are compelled to plant upon a dry gravelly soil, they dig large holes and put clay in the bottom of them and then set out the trees. They are then (it is claimed) able to get good pears upon quince stock. As I before asked, is it usual to select the kind of soil named by the essayist?

Dr. JAMES CALDER of Dauphin. I think that the object had in view by the person who selected clay soil for pears was to influence the development of the pear upon the quince, and pear wood we know grows very large, and upon the quince we do not desire a very large top. Very often the union between the pear and quince is not perfect, and we have a very large top upon what should have been (but were not) dwarf pears. The growing of wood on a clay soil is not nearly so great as in other soils. I presume that they used the clay soil to influence or retard the growth of the tops of the dwarf pears. My statement was with regard to the quince upon its own roots and not to dwarf pears.

H. H. BROWN of Columbia. I have succeeded very well in raising the quince by grafting upon the white thorn. White thorn as you know, will grow anywhere; they do not need clay soil, but will do equally well on loam gravel, or anything else. I have one stock that has grown seven years and it came into bearing in three years. I have had quinces this way the second year after grafting. My mode is to grow trees to, say, one inch in diameter and then cutting them so that they are three to four feet high and let them sprout, and the next year whip-graft them. The second year I have attempted cleft-grafting, but after the graft begins to grow, it "turns in the bark" and lifts the graft out. I only succeeded in getting one out of twenty in that way. The next year I whip-grafted with complete success; I have raised excellent quinces by this method. I have adopted the same plan in growing grapes, cutting them back and then train up the small suckers growing out from below.

H. M. ENGLE of Lancaster. I am not sure that we can lay down any rule as to growing quinces. Many years ago I planted a lot of dwarf pears at the same time I planted a few hundred quince trees on very heavy soil; these quince trees never paid me at all. I cultivated them as dwarf pears and thought I knew how, but failed. We closed them out and plowed the ground up. I planted out another lot upon higher ground, but did not succeed with them either. I had some planted in an apple orchard on cultivated ground, planting them between apple trees; the apple trees were two rods apart and the ground well shaded. In this way I was quite successful with the quinces. I pruned closely each year, or rather the large shoots were pruned close each year. I would ask the essayist why he prefers the Champion to all others.

Dr. **CALDER.** Because it has succeeded with me better than any other kind.

H. M. **ENGLE.** The drawback with me is that they ripen so late in the season; in fact, hardly ripen at all. The Orange is much more desirable with me; it bears earlier than the Champion and bears much younger, but it is the largest quince with which I am acquainted. When it does ripen, its quality is equal to any other kind that I know of; but I do know that we can do much with the Orange or Apple quince. The New Jersey horticulturists have pronounced the Champion the same as Peale's Prolific, so we need not pay two or three dollars for the latter for the purpose of getting Champions.

J. B. **SMITH.** We cannot raise the quince successfully in the Wyoming valley. I cannot give the cause of this, but state it as a fact in my own experience and in the experience of others who have tried it repeatedly.

H. H. **BROWN**, Light Street. After trying for a number of years to cultivate the quince, I felt inclined to give it up as a failure, as I could not get fruit enough for family use. The trees would grow very rank for a few years after planting, then they would either be killed by the borers or seem to die from some unknown cause. The idea suggested itself to try it on the white thorn. The latter having no enemy, it seemed that if the grafting was successful, we would then have a hardy quince. The white thorn, as you know grows well upon all kinds of soil, wet and dry. I planted white thorn bushes, which were about one inch in diameter, and cut off all of the top but about eighteen inches, which I left to send up new sprouts. The second season I whip or splice grafted the quince on the main shoot. After the graft grew to some height, I entwined some of the white thorn shoots around the quince; thus it was supported by braces on each side. The second or third year after grafting, you will have a quince tree surrounded and supported by heavy white thorn branches, and you will have no cause to watch the borer. This kind of a quince will thrive upon almost any kind of soil.

FRUITS FOR FAMILY USE.

By G. HIESTER, *Member from Dauphin.*

In my former papers on fruit-culture presented to the Board, I have treated the subject as viewed entirely from a business stand-point, and have urged the growing of fruit as a pleasant and profitable occupation. I now propose to make a few suggestions as to the importance of planting fruit in the garden, and its use as an article of every-day diet for the farmer.

It has always been a matter of surprise to me, in traveling over the country, to see so many farms that are almost entirely destitute of fruit trees, and to see large families of children raised on bread and molasses, their diet being varied occasionally with salt pork and salt beef, the only fruit they ever taste being such wild berries as they can gather in the woods and along neglected fence rows; and this, too, in a country where an abundance of choice fruit for a large family can be had the whole year round for less cost than is required to raise and fatten one hog fit for the butcher.

In the general distribution of labor on the face of the earth, a great deal of hard, unpleasant, and not very remunerative work has fallen to the lot of the farmer. It is generally admitted that, even with the best of management, he cannot expect to make any large money gain as compared with many other vocations. At the same time, he is obliged to suffer many privations by reason of his comparative isolation from society, and many disappointments and losses from unfavorable seasons; but, to counterbalance these disadvantages, a kind

Providence has placed within his easy reach the choicest fruits in almost endless variety, and, ripening at all seasons of the year, we cannot help but know that they were given for his own special use, and to compensate him in a measure for the many disagreeable tasks he is obliged to perform.

Who has a better right to the choicest of Nature's stores than the class of men who, by their unceasing toil, force the earth to yield food for their entire race? Who, by careful study of Nature's laws, have acquired the knowledge that enables them to multiply varieties at will, so that from a few wild fruits, given as a start, they have created thousands of varieties, beautiful to the eye and delicious to the taste. I claim that the best of everything raised on the farm is not too good for the use of the farmer himself.

It is a duty that every man owes to his family, to make his home as comfortable and attractive as possible, to surround himself with every luxury that his means will admit of, or his farm be made to produce.

As my topic is fruit, I will confine myself to that one item, although there are others, equally important, that are as much neglected in many localities.

It is unnecessary for me to take up valuable time now trying to prove that ripe fruit is wholesome; this is a fact long since admitted by every one, as is also the fact that a diet composed largely of fruit is the most comfortable and healthful that can be adopted, especially in warm weather.

Besides, there is nothing more convenient to have in the house; it is capable of being served up in so many ways, and presented in so many different forms, that it is quite a relief to the lady of the house, in planning the great number of meals she is obliged to prepare each year, if she can have her pantry well stocked with canned and dried fruit that is out of season, and the garden constantly yielding its supply fresh from the vine and tree. And, as often happens, a friend will call just at dinner-time on a busy day, when, to save time, a very plain meal has been prepared; now, by simply adding a nice dish of preserves and a can or two of peaches, or pears, smothered in cream, if berries are out of season, this plain meal is turned into a lunch fit for a king, and no apology is necessary. Your friends will enjoy their meal and the farmer's wife will enjoy their visit, with nothing to regret or be ashamed of.

Take away the fruit and you take away one of the chief attractions of a country home—you turn a paradise into a barren waste, and make a home that wife and children will long to get away from. Give your children plenty of fruit, and they will always cherish the memory of their childhood's home—they will leave it with regret, if they leave it at all—and it will always remain a green spot in their memory.

Every well-regulated farm should have a kitchen garden, fenced in handy to the house, which will vary in size, according to the size of the family and nature of the crops raised on the farm. In this a bed, at least thirty feet square, should be devoted to strawberries. Two hundred plants will be required to start it, if planted in rows of three feet apart and one foot apart in the row, and should contain one hundred of a good early variety, such as Triumph of Cumberland, or Crescent Seedling, and one hundred of a late variety, Kentucky, or Glendale. After the bed is once planted, you can always get plants to start a new one when desired, and this bed, thirty feet square, if properly handled, will yield enough fruit to give a large family a nice dish of berries each day during the entire season, besides a few jars of jam, for use during the rest of the year. A row of currant bushes can be planted in a border along the north, east, or west fence—the room will never be missed, while the jelly made therefrom will be very grateful along with a nice fat duck in the winter, or a leg of spring lamb in the summer.

Two rows of raspberries, thirty feet long and six feet apart, one Black Cap, and the other any good red variety, will yield all the raspberries required for table use and preserving, and will require two dozen plants for a start.

On a trellis thirty feet long, running north and south, you can plant four grape vines—two Concord, one Salem, one Pocklington—while around the kitchen porch, or on arbors alongside of the out-buildings, can be planted a few more Concord vines; remember, that with grapes, as with everything else that we grow, a few vines well cared for will give a greater yield of good fruit than a larger number if neglected.

In addition to the space taken from the garden, which is thirty feet by fifty-five feet, occupied by small fruits, an acre of land should be fenced off, at some place convenient to the house, for an orchard. In this can be planted ten apple trees, forty feet apart; we will say, one Early Harvest, one Red Astrachan, two Summer Rambo, two Smokehouse, two Baldwin, two York Imperial; ten pear trees, twenty feet apart, we will say, one Tyson, two Bartlett, one Seckel, two Howell, two Beurre d'Anjou, two Lawrence; ten cherry trees, twenty feet apart: three Black Tartarian, three Early Richmond, four common sour pie cherries; eleven peach trees, eighteen feet apart: two Early York, two Early Crawford, four Late Crawford, three Smock; eleven plum trees, eighteen feet apart: four wild goose, three green gage, three German prune; eleven quince trees, eighteen feet apart: six Orange, and five Rea's Mammoth; and, in addition to these, it would be well to plant two or three dwarf Duchess pear trees in the dooryard, where they will be useful as well as ornamental.

I have mentioned the above varieties, not because I believe them to be the highest-flavored, finest-grained, and in every way the choicest fruit that grows, but because they are all good, hardy varieties, that succeed well in almost every part of Pennsylvania, and have given me the best satisfaction of any that I have tried; besides, they give a succession of fruit during the entire season. The list can be varied to suit any locality or the tastes of any individual. Just here, while on the subject of varieties, let me say I believe the leading cause of failure in fruit-culture among our farmers is the planting of untried sorts. They all want to have the last and best new fruit. The tree agent comes around with a book full of fine pictures, and tells wonderful tales about the hardiness and productiveness of his new varieties, and the result is he buys the trees or vines represented by the highest-colored pictures and also the highest price. After waiting three or four years for them to fruit, he finds that he has made a mistake. His trees do not bear the same kind of fruit when planted in the ground as in the agent's book, whereas if he had bought the same number of trees of some old and well-tried sort, he would have saved money by the operation, and would now be gathering fruit from them both pleasing to the eye and grateful to the palate.

The varieties of fruit that I have named above will furnish strawberries from about the first to the twenty-fifth of June; raspberries from the middle of June to the middle of July; cherries in July; peaches from the middle of August to the middle of October; plums from the last of July to the last of September; grapes all through September and October; pears from the last of August until March; apples all the year round, from the first of July until the following June, besides dried, canned, and preserved fruits in abundance the year round.

The first cost of the trees, plants, and vines for this plantation, including freight charges to any part of the State, will not exceed twenty-seven dollars. When properly planted and cared for, no additional outlay will be needed for at least ten years, so that the cost would be in reality two dollars and seventy cents per year; add to this ten dollars for rent of land, and we have twelve dollars and sixty-nine cents per year, cost of growing all the fruit used in a large family. What farmer is so poor that he could not afford to spend so small an amount for this grand luxury even if nothing was saved by its use?

I leave you to draw your own conclusions on the subject.

The President having declared the subject-matter of the essay open for discussion—

JOHN MCDOWELL of Washington. A very important item in connection with fruit-culture for family use is an answer to the question "How can I keep apples all the year round?"

G. HIESTER of Dauphin. The only practicable way that we can adopt in Pennsylvania is to plant a few varieties that we know from experience are good keepers. Do not plant a general selection and then expect all to keep well, or you will certainly be disappointed. The best varieties which I have to keep until early June are the York Imperial and Romanite. Another plan is to keep them in your pocket; that is, sell your apples when ready for market, put the money in your pocket, and when you want apples during the winter, buy York State fruit and let some one else run the risk of keeping. This I find to be my most economical plan.

Mr. MCDOWELL. At what temperature would you keep apples?

Mr. HIESTER. I keep mine in an ordinary cellar or in the barn, weather-boarded on the inside tightly. Keep them in an ordinary fruit room until the weather gets so cold as to endanger freezing, then move to the cellar or other warmer place, which can be kept above the freezing point. We cannot keep the Baldwin, Belleflower, or Smokehouse in our part of the State, and the only varieties which I can winter successfully are the York Imperial and Romanite; some succeed with Smith's Cider, but I do not. My plan is to grow the finer varieties, sell them in the fall and buy during the winter in the market, thus avoiding all risk.

D. J. WALLER of Columbia. There is another method of keeping apples which I have seen tried near Bloomsburg with perfect success, and which may interest Mr. Hiester and the members of the Board. Whether it will prove successful elsewhere I cannot say, having only seen it tried in my own county (Columbia), but I cannot see why it should not succeed as well elsewhere. It is to pack your apples in ordinary flour barrels, dig a trench as wide as the shorter diameter of the barrels and about half as deep as the length of the barrels, set the barrels end to end in the trench, covering them to a depth of three inches. Your barrels when taken up during the winter or spring will be studded with beautiful crystals, perhaps an inch long, in the concave above the apples; in taking the apples out you will find them as crisp as if just taken from the tree. In bearing years, from a little orchard at home, I never fail to have apples until May and often until June, putting them into the trench in the successive order in which I expect to remove them. If you have nothing but sticks to put in the tops of the barrels, you can thus retain the apples in place when the barrels are laid on their sides. I should be glad to have some of you try it next winter and report the result at some one of our meetings.

J. G. ZERR of Berks. The same plan is excellent for keeping cabbage during the winter, I know of no better plan.

Mr. FAIRWEATHER of Erie. Do you mean three inches of earth all around the barrels?

Rev. D. J. WALLER. In answer, I will say that one year ago I was entirely laid up and had for a gardener a young man who had served five years' apprenticeship in London. When I instructed him about burying the apples, he insisted that there should be more earth around them. I told him about the icicles and he somewhat reluctantly obeyed my instructions exactly. When he came to take up a barrel during the hardest of winter weather, he wheeled it around to the side window to show me that it was exactly as I had told him. The apples will not be frozen, as there is enough fermentation in them to keep them in proper condition as to moisture. I repeat, let them down in a trench as deep as the shortest diameter of the barrel and cover three inches deep. On moist ground I lay a stick of wood under the barrels to keep too much moisture away.

J. A. HERR of Clinton. I think we very often neglect to pick our apples at the proper season and thus materially injure their keeping qualities before they reach the time of keeping. We too often leave them on the trees too long; this is especially the case with apples intended for late keeping.

But, Mr. President, I arose more particularly to allude to that delicious fruit, the plum, which, unfortunately, owing to the ravages of the curculio, has been neglected in the fruit garden and farm yard. I can well remember that some twenty years ago we had immense crops of peaches and plums, but during the past fifteen years I have not been able to produce crops of the latter fruit. I have raised a kind known as the Lombard and have a small orchard of plum trees. I took the precaution to destroy the curculio the past season by jarring the trees each morning just after breakfast, and, by laying a sheet under them, could destroy all the curculio which fell. This was done every morning for two weeks, commencing just after the blossoms had fallen. The result was that the trees were in danger of breaking down with the load of fine fruit and we had to take proper steps to prevent loss from this cause. This plum (the Lombard) is an excellent bearer of good fruit.

E. M. TEWKSBURY of Columbia. I did not hear the Sharpless mentioned in the list of strawberries by Mr. Hiester. Our people at Catawissa are a little sensitive when the Sharpless is slighted.

Mr. HIESTER. I stated that the list which I gave could be varied to suit the locality. The Sharpless does very well with me (in Dauphin county), but the trouble is that with us it yields but two pickings of large berries, after that the berry is small. It is not considered among the best for my locality. In this section (Columbia county) the Sharpless does very well, but in many sections it has the fault to which I have alluded.

H. M. ENGLE of Lancaster. I am but twenty-five miles east of Mr. Hiester, and we grow the Sharpless very well and have more of it than of all other varieties combined. We think it the most valuable berry in the State; this, however, I am aware is not the universal experience. With the essayist, I often wonder why it is that farmers raise so little fruit for family use. For twenty-five years we have not had a season without strawberries of our own growing on our table, and that, too, every day and generally three times each day. There is something in utilizing small fruits for family use and something so valuable that those who have never tried it fail to appreciate at all. It is not only a satisfaction, but it also contributes to health and happiness. Complaint has been made here that children will steal fruit and especially small fruits; they can scarcely pass an orchard or fruit patch without committing depredations. This could be avoided if the poorer classes would grow fruit as well as the rich. If all (as has been urged by the essayist) would encourage the small lot-holders to grow fruit and would show them how and contribute from surplus stock which otherwise goes to waste, much of the difficulty would be avoided; but it is human nature to take fruit, and to entirely avoid it seems out of the question. The best that we can do is to devise and foster some means by which such shall have the fruit through legitimate channels. If this Board, or the community at large, can do this, I am satisfied that, morally, we can save many boys from destruction and crime.

APPLE CULTURE.

By WALLACE TIFFANY, *Fleetville, Pa.*

[Condensed from an address at the Scranton meeting.]

It is a motto with me, that if I cannot raise as good apples as my neighbor, it is useless for me to send long distances for grafts of expensive and unknown kinds. My first failure in apple-culture was in this way: I had read a glowing account of "fifty acres containing more than five thousand trees thickly planted and well managed," and a friend had sent me the apple price-list of the New York market, and I supposed that they knew all about it. I looked over the orchard list and consulted Charles Downing's book. I, at some expense, obtained and put in grafts of the Swaar, and figured out my profits on paper. When the trees came into bearing, I found that I had cut out Swaar and had put in Swaars and had lost the time spent in waiting for the trees to bear.

I have had much trouble with my trees, not only with regard to grafting, but in many other ways. I have done a good job, and thank God that there has not been a single year for the past forty, that I did not plant some apple trees. They are all nicely arranged and in good order.

There is a tendency in orchards and trees to bear alternate years. If a frost cuts off your fruit this year, the trees will bear heavily next year. We may take advantage of this, and, by proper management, have some of our trees bear each year and not all during one year, and not all failing to bear the same year. During the season, the tree not only has to mature a large crop of fruit, but at the same time form the fruit buds for the next year's crop. Sometimes it cannot do all of this, and next year's fruit buds suffer, and a failure ensues.

I believe in pruning in February; when the tree is doing its best and putting forth all of its energies, I do not think it good policy to trim; but in the February of the following year, attack the trees vigorously and systematically. If an orchard has been neglected, nothing is to be gained by delay. Remove all superfluous limbs at once. If the frost cuts off the fruit, I would give the orchard a dressing to help a vigorous growth next year. A year of no fruit means excellent growth and a crop next year. The off year is the one to encourage growth. We should allow one year for wood and the next for fruit. I have a Clark apple tree from which I have taken five barrels of marketable fruit each year for several years, but this cannot be done long without exhausting the energies of the tree. It is a theory with me that if a graft which is inserted came from a tree bearing that year, that the bearing year will follow the graft; that is, if I insert into a tree which bore last year a graft from a bearing tree, I may, with care, have one side of my tree in bearing each year. Another theory of mine is, that the tree which is produced from a graft will live only as long as the tree from which the graft was taken; that there is anything in it I am not prepared to say.

In selecting varieties, it should be remembered that it is hardly worth while to take a light-colored apple to market, and that a dark red one will always command a better price. The purchasers would rather have them, and you should endeavor to give them such as they want and will pay best for. I have an orchard of sixty varieties, but with many of them I am only experimenting. If I were to plant again, I would have but few varieties, and they such as were known to do well in my own locality. The best bearing apple which I have to-day is the Baldwin. My orchard is on the borders of a lake, and the boys find that the fish bite best near to the Baldwin trees, and the Baldwin apples suffer accordingly. If I find an orchard loaded with fruit, I can always learn something of value from its owner. I can ascertain which varieties pay him best, which yield best, and how he has treated his trees.

We are now growing fine specimens of the Clark and Duchess Seedling. The Baldwin is somewhat inclined, of late years, to "spot in the eye." I believe with Charles Downing, that one reason of premature decay in some of our older and best varieties is, that we have used grafts from unhealthy wood. Our English Red-streak is rapidly passing away, and I think it is simply because the trees which we now have, have inherited, through the grafts, the diseases of the parent tree. As soon as we find that the Baldwin, or any other variety of apple, shows some general and special defect, we may conclude that it has about passed its prime as a variety.

It has been stated here that there are two varieties of the Greening. I have satisfied myself that this is correct, and I have the two growing upon the same tree. The difference is not due to climatic or local influences, as some have claimed. I have the two under the same surroundings, and there are differences which are easily seen by any one. If I graft the Greening upon a summer variety, I get a yellower and mellower apple; if I graft it on a winter variety, I get a much better keeper.

Some of my Baldwins have borne until they are worn out. I have cut out the larger limbs and have inserted grafts of new wood. In this way, I can soon put a new top on my trees and keep them in bearing. By doing this gradually, it will not interfere with the crop of fruit and will make a new tree. Too many fruit buds weaken the tree, and too much fruit injures the foliage, and without good healthy foliage you cannot have good healthy fruit and fruit trees. By severe cutting back I have saved many of my trees which had been injured by overbearing; any one can do this as well as myself. Try it, and see if it will not save valuable trees for you.

The subject having been declared open for discussion—

I. GARRETSON of Adams. I have been very much troubled by my apple trees blighting about the roots or near the surface of the ground, sometimes clear around the trunk and at other times but half way around, but sooner or later it extends all around; can the speaker or any one else tell me the cause and suggest a remedy?

Mr. TIFFANY. Is it the King of Tompkins County, or is it the Seek No Further? These are two of the four varieties which I have found to blight in this way.

Mr. GARRETSON. The trees alluded to are the Pound apple, the Newtown Pippin, and the Smokehouse.

Mr. TIFFANY. I have grown the Smokehouse quite extensively, but have not found it liable to this trouble.

A. C. SISSION. I think it quite probable that the trouble is caused by the hot sun shining on the trunks of the trees in the spring before the sap has started. I find it on the side of the trees next the sun, and think that the damage is done during the few first warm days of early spring.

Mr. TIFFANY. I have heard this assigned as a cause, and have covered the trunks with a board box, but the blight went on just the same as before.

JOHN McDOWELL of Washington. My observation is that the seedling trees are longer lived than those from grafts. Can there be anything in the way in which the trees are taken up in the nursery? A considerable portion of the roots are then cut away, and in dry seasons they do not retain enough moisture to keep the trees growing; when the top root reaches down into the subsoil, in the natural way, it may be different.

Mr. TIFFANY. Evidently that is true, capillary attraction brings the moisture to the surface in dry times, but I cannot see why it should exist as a reason if the trees have been properly taken up in the nursery.

Mr. SMALL. Can you grow a healthy tree from an unhealthy graft?

Mr. TIFFANY. I think not; the graft can and will carry the disease of the parent tree with it.

A. C. SISSION. Why does Mr. Tiffany recommend the Clark apple in one breath and in the next tell us to plant red apples only?

Mr. TIFFANY. I would plant the Clark because I know that I can grow it; but there is more in a peck of the old-fashioned Spitzenburgs than in a bushel of the Clarks. But the Clark is a great grower and great bearer, but they are not rich, but for our own use we like the Clark. In Scranton I can sell no apple better than the Clark.

WILLIAM GATES of Venango. How do you get rid of the borer?

Mr. TIFFANY. I have never succeeded in getting rid of them. To save the trees requires a constant fight with the borers. An old apple-grower, Jesse Stevens by name, taught me that the best means to check them was to carefully scrape the bark of each tree from the upper root to a point above the surface of the ground; by removing the earth this can readily be done, and I believe that it is the only effectual way that can be found. Some years ago I put strong wrapping paper around the lower parts of the trunks, and sometimes the sides of tin fruit cans, but the only sure way is to scrape the bark carefully, and whenever you see that the borer has effected an entrance cut him out, or, better still, for it injures the trees less, follow him up with a fine wire. The first year of his entrance he merely gets through the bark. During the second year, he starts on his tour under the bark, and, if his course happens, as it very often does, to lay around the tree, he soon kills it by girdling it. The time to attack him is as soon as possible after he has effected an entrance, and every day after that adds to the danger; he can never be so easily reached as at that time. If you will carefully scrape the tree a few times, it will be comparatively safe.

JOHN PELHAM. A few years ago I purchased a farm near to where Mr. Sission lives, and on that farm I found an orchard very much neglected. I fell in with Mr. Sission and had a talk with him. Having had an orchard of one hundred trees sadly neglected, he gave me his views, and suggested that I get wood ashes and go to work and make lye and pour this lye around the roots of the trees. In this way I got shut of the borer effectually. I did not succeed very well in the young orchard, for the trouble had gone so far that the trees were breaking off at the ground, but with larger trees I succeeded very well. If it is applied carefully, it will not injure the trees, but there is some danger with small trees recently set out.

SOLOMON LEWIS. I find that eternal vigilance is the price of apples as well as of other kinds of fruit. I find that after going over mine carefully, I still loose a few, but not many. With regard to the blight alluded to, I find the Fallowater to be most affected. When I graft these trees on native stock they are not thus affected.

H. L. SCOTT of Bradford. A few years ago we found that the King apple in a couple of rows in my orchard were all dying, and next year they were all dead. They were not large trees, but were excellent bearers. I can assign no cause for their death; all the trees on either side of them lived, but not one of them survived.

J. A. HERR of Clinton. There is perhaps no fruit so susceptible to change by removing it a few rods from its native home as the apple, and it has been well said by Mr. Tiffany that the farmer or fruit-grower who cannot raise the apples of his own locality successfully need not try those from a distance, because they are recommended. The best recommended fruit, though but a few miles away, might prove to be poor bearers on different soils.

This question of blight on apple trees is very interesting, but I suffer much more loss from blight on my pear trees. I do not know whether, in this discussion of fruits and fruit-culture, we may not branch off a little from the subject of apples to that of pears, and endeavor to gain some information and cure for blight on pears, for I think that fully ten pear trees die for each one of apples. Some varieties of the pear blight much more readily and frequently than others. The leaves will change color sometimes in a single day, and in a week's time the tree will be dead. Others blight in the bark in patches half-way around the tree, the rest growing vigorously. I have tried several remedies, but none have proved effectual with me. I have tried placing the blood of animals around the roots close to the tree and with beneficial effect; but I am losing trees every year and I would like very much to know what to do to prevent it. In my garden, just below my pear orchard, I have never lost a tree from this cause; south of this I have been losing some all the time. Can any one present explain it?

Mr. **GARRETSON** of Adams. The explanation of Mr. Tiffany, that the blight may be due to a want of proper nourishment in the soil, will not suit my case, for the trees are well fed; the trees are fine and healthy and the branches are long and shelter the trunks well. In regard to blight in pear trees. I have had some experience, and have a very large pear tree in front of my door which bears abundantly. Two years ago it commenced blighting and I commenced cutting out the blighted branches as fast as I noticed them. The tree is now bearing plentiful and looks well.

Mr. **TIFFANY.** Did Mr. Garretson ever try cutting back his apple trees severely? I think that we will find that this species of blight is confined to a few varieties, of which the Fallowater is one of the worst.

Dr. H. **LEFFMANN**, Microscopist of the Board. Blight shows itself in different ways and in different forms. From a scientific stand-point the question is an interesting one. It has been studied by a number of specialists; among them some have advanced the theory that it was due to the absence of potash in the soil, and that where this existed in sufficient amounts the trees did not blight at all. Where the disease is parasitic, the primary condition is one of defective nutrition in the plant. Where the ground is rich in potash, the tree gets sufficient nutriment for a healthy growth. All that I have been able to gather corroborates this theory of defective nutrition. It is, therefore, not in itself, strictly speaking, a disease; it is the development of disease spores in the plant. This, I think, will be found to be the solution of many of our plant diseases. It may be that the lacking of a single ingredient is the cause of blight; at least this is the scientific theory.

A. C. **SISSION.** I have observed that the most thrifty trees are the most likely to blight. This is in contradiction to this theory of mal-nutrition.

Mr. **APPLETON.** I think that it may be due to the stoppage of the proper circulation of the tree—to what is sometimes called "hide-bound." I have found that slitting the bark on each side from the roots to the branches would save the tree and check the trouble.

At the Honesdale meeting, **THEODORE DAY**, Esq., of Susquehanna county, read an essay, from which we take the following as referring to apple-culture:

"It is well known, at least to such as read the agricultural papers, that some persons can obtain much better prices for their fruit than others can get in the same market for the same kind of fruit. This they could not do but for the fact that they take much better care of their orchards than others. We also learn that the orchards which are properly fertilized and manured are the ones which produced the fruit which commands these extra prices. During the past season, I have passed through many orchards, and among them all I found very few trees that were properly pruned or cared for. The consequence was that the fruit was smaller than it should have been, and more imperfect, too. Among my own trees, those that are well-trimmed throughout, the whole top had nearly every apple perfect. No limbs broke, though they were well loaded. Another item of much importance is, that the same trees are now well set with fruit buds for next season's crop. By proper attention to pruning and other care, fruit trees may be made to produce good crops every year, provided frosts and cold winds do not interfere. I also have noticed that where the top was too thick the fruit was small and imperfect. Thinning the fruit as soon as it has fairly set will pay well. This will pay as well as any other work that can be done in the orchard. It is often the production of too much wood and foliage which exhausts and injures the tree. There are comparatively few varieties of apples and pears that it will pay to grow for market. The best thing that can be done with such trees as bear unprofitable kinds, is to change the top and kind by grafting. Cut out many of the superfluous limbs and graft the others with good kinds which will market well. All suckers should be removed several times through the summer and the larger limbs in the fall, after growth has stopped for the year. Grafts and young trees should be so pruned that the light and air may get into the center of the tree. The dew and sunshine should have access to every leaf, if possible. Many trees which are grafted, even with desirable kinds, are so thick that in two or three years they have to be pruned very severely, and much injury, which might have been avoided by earlier attention, avoided.

GRAPE-GROWING IN CENTRAL PENNSYLVANIA.

By J. A. HERR, *Member from Clinton county.*

The grape has been the emblem of fruitfulness and wealth from time immemorial. There is no fruit so universally grown, so well adapted to such a variety of soils and climate, and so easily produced and handled as the grape. Besides, it is healthful, useful, and palatable. It can also be so economically grown, occupying often but a small space by the side of a fence or building that would otherwise be a waste, affording a delightful shade and agreeable fragrance and luscious fruit alike to rich and poor, from the middle of summer to the beginning of winter.

Although so universal in its adaptation to different situations, we must not infer that there is no choice of soils and situation in the growth of the vine. While there are varieties suited to nearly all situations, the finer and better quality of grapes can only be grown to perfection in the most favored localities. In this locality, the most desirable situation is an elevation sloping towards the south or southwest, (especially for the later ripening varieties,) with a soil dry and gravelly, or a sandy loam.

The proper situation having been selected, the next thing in order in planting a vineyard would be to mark out the ground in rectangles eight by twelve feet; or, if to be trained on trellises, at greater distances, so as to allow the vines to be easily worked. The holes in which to plant the vines should be dug not less than three feet square and two feet deep. In the bottom of this hole should be put coarse manure or rubbish, bones, chip-dirt, road-scrapings, top-soil, and other substances calculated to keep the soil porous and easily drained, as well as being benefited by the slowly decomposing material. On the top of this should be put some top-soil, at least moderately fertile, in the shape of a mound in the center, around which the roots of the vine should be carefully placed so as not to cross each other. The soil should then be worked in compactly about the roots, care being taken to leave no air-chambers underneath. The balance of the soil taken from the pit can then be filled in, leaving the top roots not more than two or three inches from the surface. Pack the soil then tightly, filling in enough loose soil on the surface to prevent baking. If the planting is done in the fall, the ground should slope *from* the plant in order to carry away the water; but if in the spring, the surface should be level or inclined a little towards the plant to carry the water *to* it. A strong stake should be set near the vine for the double purpose of marking and protecting it from being trampled upon before beginning to grow, as well as to afford a place to which to train the young vine for the first season's growth.

TREATMENT AFTER PLANTING.

The ground should be cultivated frequently and kept as clean as is necessary to grow a good crop of corn. A thin covering of well-rotted manure, pulverized and worked into the surface soil, would be of great value. If we would have good grapes, we must give the vines good treatment, for a starved or neglected vine or tree will no more flourish than will a starved or neglected animal. The idea that trees and vines need nothing but planting to bear plenty of luscious fruit is highly erroneous.

There is no labor of the husbandman that will better respond to handsome returns than the proper, timely, and intelligent care of grape-vines. Some of the coarser, wilder, and most hardy grape-vines will endure a great deal of neglect and yet produce a fair crop of grapes, but even these will be wonderfully improved with intelligent care.

PRUNING THE VINES.

The manner of pruning the vines depends upon several considerations. *First.* The variety, whether naturally of strong or weak growth. *Second.* The manner of training, whether over an arbor or to a single stake. *Third.* Whether it is desired to renew the vines frequently or not. In either of these instances, they should all be started alike at the end of the first year. (And here let me state that it is seldom desirable to plant vines that are more than two years old.) If the vine at one year's growth is vigorous and heavy, it should be cut back to two or three buds, leaving not more than two to grow the second season; if weak and of slender growth, only one bud should be allowed to grow. In order that the growth the following season may not start too near the ground, several inches of grape-wood may be left, and all the buds except the upper may be rubbed off. These may be trained to an upright stake for the first season. The second season these two arms left from the first year's pruning should be cut back to about eight to twelve buds each, not more than half of which should be left to grow. The weaker buds must be rubbed off. These two arms may then be trained horizontally to a bar or wire between posts, and the shoots of this season's growth trained uprightly to other wires above them.

This year a few clusters of fruit may be allowed to grow on strong and vigorous vines. In pruning vines for fruiting, this *fact* must always be held in mind: the fruit is always borne on shoots of the present season's growth growing on wood of last season's growth. If in pruning we remove all of the last season's growth, there will be no fruit. In the second year's growth (from transplanting) no shoots should be allowed to bear more than two clusters each, and but few shoots allowed to bear at all.

The third year from transplanting the vines can be extended laterally, if desired, by laying horizontally the terminal vine of the second season's growth to the distance desired. The uprights should again be pruned to not more than three eyes each, of which the two stronger ones only being left to grow and bear. In a good bearing variety each shoot will produce from two to four clusters, averaging not less than three clusters. The number of shoots left on for bearing must depend on the strength, vigor, and character of the vine, and this must be determined by the judgment of the vine-dresser. A study of variety, as well as of strength of vine, is of importance at this point. In older vines it is often desirable to allow new strong and healthy shoots to be left several feet in length to take the place of some of the old wood, which may then be removed, and thus the vine be partially renewed each year. Frozen, stunted, and unhealthy wood should always be removed, even if at the sacrifice of a season's fruiting or of misshaping the vine. The proper season for pruning is in the fall of the year after the leaves have fallen. If not then attended to, it may be done at any time during the winter, when the weather is not severe nor the grape-wood frozen.

Many persons prefer to wait until the severest part of the winter has passed, so as to be able to remove all the frozen wood from the vine. Vines pruned after March 1 are very apt to bleed when the sap begins to flow in the spring. Yet my practice has been to prune during March, if neglected until that time, and I think with better results than to leave the vines unpruned. If, however, the vines are neglected until April, or later, the vines may yet be relieved somewhat by rubbing off surplus buds or shoots. This will require a great deal of time, but is preferable to entire neglect.

Thus far I have only spoken of winter pruning. There is also a summer pruning or pinching to be attended to if we would have fruit of the finest quality. This consists in pinching off the ends of the bearing shoots after the clusters can be seen, about two beyond the last cluster; also in removing all shoots not bearing fruit, except such as are desired for the succeeding season's fruiting or the reshaping of the vine.

This reduces the work of the vine to the development and maturing of the fruit, and produces the large, handsome, and well-filled clusters of luscious fruit.

The gathering, trimming, packing, preserving, and marketing of grapes I will not attempt to treat of in this brief paper. Nor will I undertake to discuss the subject of insect enemies nor diseases of the grape or vine, which are so detrimental to the vineyard. A few words as to varieties and I will close.

Our country is flooded with new "candidates for public favor" in the grape business, and some of these new grapes are really an acquisition. We seem to be making some valuable progress in the effort to grow hardy native grapes whose quality rivals the best foreign varieties. The great effort in grape propagation is to produce a grape which combines the excellences of the foreign and hot-house varieties with the hardiness and productiveness of the Concord and similar varieties. These new varieties have yet to undergo the test of time and locality before we dare be sanguine of their entire success. We can well afford to await these tests before investing much in new varieties. Of the new varieties which have come under my observation, the Niagara seems to take the lead, closely followed by Brighton, Prentis, Pocklington, Martha Washington, Jefferson, Wilder, and a few others. The Concord is still the grape for the millions, on account of extreme hardiness, productiveness, size, and quality. The earlier-ripening dark varieties, including Talman or Champion, Telegraph, Seneca, Janesville, Ives, and Hartford, are all hardy and productive, and mature from six to ten days earlier than Concord, and are chiefly valuable on account of their earliness, but their quality is not equal to it. Moore's Early is said to excel in quality and size, but lacks somewhat in productiveness. Martha is the best hardy white grape among the older varieties; the Lady is better in quality, but less vigorous and productive.

Gœthe, Elvira, and Catawba are too late for this locality. Croton, Eumelan, Iona, Perkins, and Arnold's Hybrids have been a comparative failure with me.

Rogers' Hybrids, including Salem, Agawam, Lindley, and Massasoit, are all excellent and tolerably productive, but in some seasons subject to mildew and premature falling of the leaves. Many of these finer quality grapes, in favorable locations and for amateur cultivation, are a decided success, which, for general vineyard culture, would be a failure. Some varieties require a rich soil and high fertilization in order to succeed, while others seem to thrive best in a light sandy soil which is only moderately fertile. A study of the habits and requirements of the different varieties is necessary to success in grape-growing.

While we would not recommend everybody to engage extensively in cultivating grapes, there are few families who own their residences, or even rent for a series of years, that would not be well repaid for some attention to growing this most desirable fruit.

The propagation and improvement in varieties, as well as the production of new varieties, we leave for the nurseryman. Experiments are expensive, and, unless long continued, are seldom valuable. Our remarks are more particularly addressed to the general grower, and if we succeed in inducing any of the people to interest themselves in the production of choice grapes, the object of this paper will be accomplished.

INSECTICIDES AND THEIR APPLICATION.

By the SECRETARY.

The great increase in the area planted with fruit, and the comparatively recent introduction of several European insect pests, has caused a great demand for a cheap and efficient insecticide. Numerous mixtures and patented compounds have from time to time been placed on the market, but our examinations have usually shown them to be composed of two or more well-known insecticides or the adulteration of one in common use. Each year a considerable sum is thus extracted from the pockets of our fruit-growers, without any legitimate return. In most cases, one tenth of the amount of money, if expended in some one or more of our standard insecticides, would have not only had more effect upon insect life, but would also have saved a large sum of money in the original outlay.

From the fact that this loss is usually slight to the individual grower, we are apt to overlook its immense aggregate in the country at large; and the injury being divided among a large number of pests, we often lose sight of the aggregate damage done by even a single one of them. It is estimated that from 1865 to 1878, the cotton worm (*Aletia argillacea*) caused a direct loss of over thirty millions of dollars in nine of our principal cotton-producing States. In 1874, it was estimated that the loss caused by the Rocky Mountain locust (grasshopper) in three States alone amounted to seventy-five million dollars. In the State of Illinois, it is estimated that in some years the chinch bug has damaged the wheat and corn to the value of seventy million dollars. In 1875, Prof. Riley estimated that Missouri alone lost fifteen million dollars, in but twenty-five counties, from the same pest. Prof. Lintner, of New York, estimates the average annual loss of the United States, from all insect pests, to be over two hundred million dollars. Walsh estimates it at three hundred million per annum. The Secretary of the Ohio State Board of Agriculture places the loss of that State by the wheat midge, in 1854, at seventeen million five hundred thousand dollars.

To assist in counteracting the attacks of this vast army of depredators, we have a few insecticides which can be depended on, but in very many cases much of their value is lost from deferring the application too long, and by not keeping it up sufficiently late in the season, many failing to appreciate the fact that every insect destroyed late in the season is worth as much as the destruction of many thousands during the early part of the *next* season.

The following may be named as among our best and most efficacious insect destroyers: Hellebore, kerosene, carbolic acid, coal tar, gas lime, bisulphide of carbon, Paris green, oils produced from coal, London purple, pyrethrum, and common lime. The virtues and mode of application of each may be thus stated.

HELLEBORE.

White hellebore is the finely-powdered root of the white hellebore, (*Veratrum alba*,) and may be applied either in a dry state or in connection with water; for the dry application, very simple apparatus will accomplish the purpose as well as more expensive machinery; a small box covered with coarse muslin, or with very minute holes in its metal lid, may be used with the best results. Its cost (and value) will very much depend upon its purity, and varies from thirty-five to seventy-five cents per pound. It produces death not only by contact with the insect, but also by being eaten with the leaves. If applied in the dry state, the application should be made when the leaves are moist with dew, or just after a rain, and care should be taken to renew it as soon as the rain is over. If mixed with an equal portion of wheat middlings or buckwheat flour, it will usually remain on the leaves for a longer period than when applied pure, but care should always be exercised to have the mixture complete. For many purposes it will be found more convenient to apply it in connection with water; for this purpose, a mixture in the proportion of two ounces of the drug to thirty gallons of water, or four large tablespoons full to the same amount of liquid, will be found most convenient for general use. If the drug is put into the water while hot, and the mixture stirred for some time while cooling, less will do, and for the purpose of causing it to remain on the foliage for a longer period, a small proportion of carbolic soap, or even common washing soap, may be added while the fluid is well stirred. Hellebore is found to be the most effectual of all insecticides in the destruction of slugs of all kinds, and especially of such as infest the common rose bush and the pear tree. For rose bushes, two tablespoons full thoroughly "drawn" in hot water. Twelve quarts will accomplish the desired effect by three or four thorough applications. In lieu of any more extensive implement, a whisp of hay or straw or an old broom may be used to apply it, and will prove as efficacious as some of our most expensive syringes. Prof. Lintner suggests that our common polk weed (*Veratrum veride*) may prove valuable as a substitute for the oftener-tried hellebore.

KEROSENE.

This insecticide, unlike the former one, seems to act more by closing the breathing tubes of the insect than by actual poison, and hence must be applied with a view of coming in contact with the insect rather than with the plant injured. If applied in too strong solutions or in too liberal quantities, it is dangerous, from the fact that by forming an air-tight covering over the pores of the leaves, it may prevent respiration. The amount to be used must vary with the nature of the plant and insect. The average application is at the rate of a pint of coal oil (kerosene) to ten to twenty quarts of warm water; but this may be increased for hardy, heavy-leaved plants, and must be decreased to suit the natures of many of our more delicate hot-house plants. The smallest portion of the oil, if in direct contact with the insect, is sufficient to produce death, and it has been claimed that its odor will repel some classes of insect pests. Prof. Comstock strongly recommends (where large amounts are not needed) a mixture of kerosene and milk, in the proportion of two of milk to one of kerosene. The great benefit claimed for the latter mixture is, that the union is much more perfect and lasting, while that of oil and water requires constant motion to keep the strength of the liquid to the proper standard. The value of kerosene as an insecticide is much greater with the class of pests which infest our animals, and it is in the stable and stock-yard that its benefits are greatest. For this purpose it may be mixed with milk or with any form of oil or grease, and applied directly to the infected spots. Care must be taken to dilute it somewhat, or to apply the undiluted oil in small quantities, as an over-dose will remove the hair.

CARBOLIC ACID.

This insecticide is mainly beneficial as a means of combating the insects which prey upon animals, but has been used with some degree of success upon plants also. Prof. Cook recommends its use in the garden, where it may either be used with water or combined with any form of soap. Prof. Lintner recommends its use, when diluted with water, in the proportion of one of acid to one hundred of water, as an application to the soil in which pot plants are growing, for the purpose of destroying worms and slugs after they have obtained a lodgment, or of preventing their presence. In the garden and orchard, it is, in the hands of the inexperienced, a dangerous help and may readily accomplish more injury than benefit, and must never be used except when very much reduced with water. Owing to the very uncertain and unsatisfactory proportion used in the soaps now in the market, it will usually be found more satisfactory to purchase the crystals, (or in the cheaper crude form,) and make the mixture for each application.

BI-SULPHIDE OF CARBON.

From its penetrating and intensely unpleasant odor, this drug has not been prominently brought before the public, for the purpose which we have under consideration, and for similar reasons its use has thus far been confined to plants alone. In France it has been claimed that this drug is a sovereign remedy against the dreaded phylloxera, but the difficulties which attend its successful use will prove a bar to its general application. As a remedy for such parasites as prey upon the roots it will eventually prove very valuable, and is, in fact, the only one yet introduced which seems at all likely to answer the purpose. With a sharp bar, holes from two to three feet deep are made among the infested roots, and after a small portion of the drug is introduced, the opening is closed by tramping earth into it. In course of time, the vapor resulting from decomposition will penetrate the minute interstices of the soil, and prove fatal to all insect life with which they come in contact. Prof. Lintner, while doubting the benefits to be derived from underground applications of bi-sulphide of carbon, admits that its pungent odor makes it a valuable adjunct in the nursery and garden, in repelling the attacks of insects for the purpose of depositing their eggs.

PARIS GREEN.

This insecticide is so well known that anything which we may add may seem to be superfluous, and yet much damage is annually committed by its improper application and use. Loss often ensues from too strong an application, and we have noted potato patches where the damage from the application was nearly or quite as great as if the beetle had been allowed full sway. The failure to appreciate its great danger as a virulent poison has also caused considerable loss in live stock, and to the person applying it. Like hellebore, it should always be applied in a diluted condition, and may be used either dry or in combination with water or other liquid. The drug is a combination of copper and arsenic in equal proportions, (fifty-eight of arsenic to forty-two of other ingredients,) and being insoluble in water, can only be used in a state of mechanical mixture, and needs continued stirring during its application. The proportion of dilution, either dry or in connection with a liquid, must depend somewhat upon the nature of the vegetation to which it is applied. For potatoes and other hardy-leaved plants, one pound of the drug may be thoroughly mixed with twenty-five of flour, middlings, or land-plaster; but for more tender plants the proportion must not exceed a half yound of the drug to twenty of flour. In all cases where plaster is used, an allowance for its weight (as compared with flour or middlings) should be made, and about the same bulk of each used. Instead of flour, any finely divided and dry material may be used; dry dust from the road, finely sifted ashes, or bone dust; chicken manure, will answer the purpose equally well. It should be remembered that a thorough mixture of the two is very important, and that if a complete mixture is insured, a portion of the Paris green may be left out. When applied in conjunction with water or other liquid, it must be remembered that the drug is only kept in suspension by motion and that it is not dissolved. As when in the powdered state, the proportion of the two ingredients will vary very much with the character of the plants on which it is to be used. For delicate leaves, half a pound of Paris green to thirty gallons of water will be perfectly safe, and most plants will bear twice as much. For potatoes and plants of similar growth, in nearly all cases too much of the drug is used, thus not only increasing the danger of injury to the leaves, but also involving a waste of material. A half pound of Paris green to thirty gallons of water will, if kept in suspension by constant motion, produce as beneficial effects as three or four times that amount carelessly applied. Practical experiments have clearly proven that insecticides, of which Paris green may be taken as a type, undergo certain chemical changes very soon after their contact with the soil, which completely neutralizes their power of harm by entering into the circulation of the plant. Prof. McMurtrie, of the National Department of Agriculture, by a series of practical tests, proved that applications of less than nine hundred pounds of Paris green per acre had no perceptible effect on plant growth, but that after this amount was exceeded, a bad effect was shown. It was further shown that even this effect was but temporary, and that very soon after the admixture with the soil was effected, all power of damage was lost. This, of course, does not apply to applications direct to the foliage of the plants under experiment. A half ounce to a gallon of water will kill the young sprouts of potatoes, and less will have the same effect upon other garden products. The ordinary application to potatoes should not exceed three pounds per acre, hence it will be seen that all fears of injury by absorption are groundless.

Gas Lime.

Fresh gas lime, when completely powdered, is highly spoken of as an insecticide, and if all that is claimed for it is correct, is one of our most economical insecticides. It is a waste product of gas works, and is produced by bringing the impure gas in contact with moist quicklime, by which certain injurious components are absorbed by the lime.

An analysis of this product would indicate that its value for the purpose under consideration is due to the sulphide of lime which it contains. The proportion of sulphide varies with the special process of manufacture and with the materials used, but it may be estimated from fourteen to seventeen per cent. in the average specimen. Aside from this, gas lime contains but little more than carbonate of lime, which has little effect upon insect life. When applied in considerable amounts to the surface of the soil, or when mixed with the surface soil, it has an excellent effect in destroying insect life in all its forms; but too heavy an application in its fresh state will injure many forms of plant growth. If allowed to remain in the pile until it has undergone chemical changes, its value as an insecticide is largely lost, but its value as a fertilizer is increased until its effect is identical with that of lime, and the same rules hold good for the application of both. By exposure to the atmosphere, the sulphide of the fresh lime is soon converted into the sulphate, and is beneficial to plant life. It is claimed that the ravages of the army worm and white grub can be materially lessened by the application of fresh gas lime in amounts not sufficient to injure vegetation.

LONDON PURPLE.

This is a waste product resulting from the manufacture of certain dye stuffs, and analysis shows it to be mainly arsenic in a state of combination with lime (arseniate of lime), and hence its application and effects are very similar to those of Paris green. Its cost is not more than one third that of Paris green, and in large amounts may be purchased for even less. In the large cotton plantations of the South, it is a valuable adjunct in heading off the boll worm and other enemies of the cotton plant. It is much less likely to injure vegetation than Paris green, and is not as dangerous a poison to the human race. One pound of the purple will not injure delicate leaves, and one pound to forty of flour (if thoroughly mixed) is sufficient to destroy insect life. In applying with water, a small portion of water should first be added until the mass is reduced to a smooth pasty consistence, when more fluid may be added and the mixture constantly stirred until sufficiently reduced for application. The mixture of a small portion of paste made from well-boiled flour will cause the mixture to adhere to the leaves, and hence do greater execution. Prof. Cook alludes favorably to the use of the London purple as a preventive for the ravages of the apple worm, or codling moth. The trees should be well sprayed during early summer, and a tablespoonful in a bucket of water is stated to be sufficient for three trees of average size. It is supposed that the thin coating formed over the immature fruit prevented or deterred the deposit of eggs. As an insecticide it has many advantages over Paris green, and when thoroughly introduced, will no doubt supersede the latter.

PYRETHRUM.

Pyrethrum, or "Persian insect powder," consists of the powdered flowers of the *pyrethrum roseum*. Under the increasing demand for this powder, its cultivation has been commenced in California, and it has been found that the home-grown product possesses all of the virtues of the imported, and can be furnished at much less cost. It is claimed that its production will soon add another integer to the agricultural wealth of California, and States having a similar climate. One claim possessed by pyrethrum, and which it does not share with Paris green, is the great variety of modes of application. In the form of a powder, as it comes from the druggist, it may be applied by any of the many patented appliances. The flowers may be steeped in alcohol, and, after dilution wtih water, may be applied with a rose syringe. It may be boiled with water and applied with a syringe as a decoction, or it may be burned in the greenhouse or conservatory, and accomplish the same effect by its fumes. As it comes from the stores it is usually more or less adulterated, and requires little or no reduction; but if perfectly pure, should be thoroughly mixed with from ten to twenty times its weight of fine flour or middlings. For some plants and some insects, the weaker mixture will give more satisfactory results than the pure article, or than the minimum reduction. Upon young larva it may (if pure) be used with from twenty to thirty times its weight of flour, and give even better results; but in all cases the incorporation of the two ingredients should be complete and thorough, or damage may be done to tender shrubs. In all cases it will give the best results where the mixture with the flour takes place twenty-four to thirty-six hours before the application. Its application in the form of fumes is usually confined to firs or small house plants, but its cost will prevent its general use in the open air in this way. If slightly dampened and made up into small balls or cylinders, it will give off fumes of the most destructive nature and increased volumes.

When applied in connection with water, it is found that a pound of pure pyrethrum to thirty gallons of water will prove sufficiently strong for all ordinary purposes, and that for some purposes and for general greenhouse use. Unlike the dry mixture, the fluid form must be used as soon as practicable after mixing, for it rapidly loses its virtue by standing. For liquid applications, it is most economical to first mix with a small portion of milk-warm water before adding the bulk of the liquid.

SUMMARY.

In the application of any insecticide in a dry form, it is essential to success that the foliage should be damp, and hence the best time is just after a rain, or early in the morning before the dew has dried off. If the application cannot be made at such a time, they will be found most efficacious in the liquid form. In the latter case, adherence to the leaves may be promoted by the addition of a small amount of milk or other slightly oily substance, but on account of the great difficulty in insuring an equal distribution, it is not safe to use pure oils or fats; as a substitute, a small portion of flour may be thoroughly boiled into a paste and completely incorporated with the liquid. The greatest disadvantage to the use of dry insecticides in dry weather is from inhalation by the person making the application, or by the lodgment of the poison upon sores or in abrasions in the skin. This danger is in a great measure avoided by the use of the liquid preparation, the application of which is not dependent upon the condition of the surrounding air. In a liquid form, a less amount of most insecticides will be required.

In all such applications, whether in a dry or liquid form, to garden plants it should be remembered that the poison may be retained among the leaves of cabbage, lettuce, and kindred plants, and that it may remain undisturbed in the hollow crowns of the beet, parsnip, and carrot.

FARMERS' DAUGHTERS.

By Hon. C. C. MUSSELMAN, *member from Somerset.*

Much has been written upon the subject of farmers' boys—how to educate, and how to keep them on the farm. But nothing has yet been said upon the subject of girls, or farmers' daughters—how they should be trained, and how to keep them on the farm.

Women have a great influence over men, and if we can manage to keep the girls on the farm, the boys will be slow to leave. The subject assigned to me is very important, and entirely new, and should have been referred to one of more ability.

According to Divine revelation, God created the first man a farmer, and the first woman a helpmeet and a companion to the farmer. And Webster's definition of helpmeet is the same as helpmate, namely, an assistant, a helper, a companion, a consort, a wife. It would seem, then, from this definition, that the first woman was not only a nominal wife, but an assistant and a helpmate.

It is idle to indulge in sentiment and deplore the necessity of a certain portion of farm work for women. The fact still exists that millions of the human race, even in this great country, must in the sweat of their faces help to raise bread out of the soil before it can be eaten, and of that class there are nearly as many women as men.

Few subjects are of greater importance than the relations of American women to rural industries. As sensible beings, we must take facts as we find them. And we find that the country women, whether of home or foreign birth, have always taken, and do yet take, a great share in the labors pertaining to farm life, and very properly, too. It is true that the heavy work and the drudgery of the farm should be done by men, neither is it necessary that farmers' wives and daughters, or any other woman, should work in the field with men, like our mothers and grandmothers had to do before we had all the labor-saving implements and machineries now in use.

It is equally true that no small amount of the products of the farm can be and is properly raised by the weaker sex. Look at the millions of dollars, worth of butter and cheese that are annually manufactured by the hands of the fair sex. The eggs and poultry that are raised, amounting to millions of dollars more, the most of which is due to the industry of the farmers' wives and daughters. The sweets of the hive are largely collected under the directions and care of women. Many millions of dollars more are very properly put to the credit of female labor in the shape of garden truck for house use and the market. Then come the small fruits, and the long list of berries, both wild and cultivated, that are picked by female hands, amounting to the fortune of a millionaire. Then think of the plants and flowers that are watched and cultivated by the fair sex to beautify and decorute the many homes. Planting, weeding, and hoeing are still done by thousands of our best and most noble women, young and old, who are not yet too highly civilized and refined for any earthly use. And if you want to find a truly beautiful, natural, and healthy lady, with rosy cheeks, you must seek for her among this class, somewhere out in the open air following the dictates of God and nature.

Not that women should hold the plow, dig ditches, or build fences—oh no! There are occupations belonging to agriculture particularly feminine, and all true ladies will dignify and ennoble, instead of degrade, their character by engaging in them.

There are many great and noble women thoroughly acquainted with all the practical operations of farming, who even superintend and manage large estates successfully, and still they have all the accomplishments necessary to a lady, minus the affecting, simpering, and whining of the gossamer kind.

It is proper that farmers' wives and daughters should acquaint themselves with the general management of the farm so that they can give directions in the management of farming, in the absence of the father or husband, either living or dead. If women are competent to rule empires and kingdoms, what should hinder them from swaying the scepter over a farm?

How ennobling, instead of degrading, and what influence would such self-reliance be in establishing habits of industry and manly character in their children! One such an example is worth more to humanity than all the highly refined, simpering, fashionable coquettes, with all the dudes and dandies thrown in.

The root idea of modern girls now is, to be like the shoddy girls of the upper class, who are a mere imitation of the real thing. They put clean out of sight the notion that women were destined for anything like Webster's definition of helpmate, or that they had anything to do with the perpetuation of a useful, healthy, human race. They have lost, in a measure, all the natural affections, but try very hard to cultivate love by the reading of novels, which treat only on love and marriage, a state for which they are poorly fitted.

There are thousands of noble and independent ladies who have not bowed the knee to Baal, and, happily, they are found in all communities; if they are not the salt of the earth, they are at least the salt of their sex. Their great force lies more in what they are than how they look. There are thousands of good and patriotic women, who are sensible of the blighting effect of fashionable life, who are vainly trying to reform, but they are perfectly powerless, being bound with a chain which they are helping to make.

But the question might be raised, what has fashion to do with agriculture? I would answer that it has much to do with all vocations, especially with agriculture? We might ask, what has pleuro-pneumonia to do with agriculture. I had almost said, what farmers do not raise is not worth raising, and among the many things they do raise, is live stock; coquettes, dudes, and dandies are dead stock, in which, unfortunately, our sons and daughters are too freely investing.

A man or woman with no business, or anything to do, is an absolute pest to society. They are drones, wasting the fruits of others' industry, setting an example of idleness, and idleness is the devil's workshop, and laziness is the master workman.

It is the duty of the human race to labor, but misdirected labor without a definite purpose is scarcely better than none. Our daughters, as well as our sons, were created for wise and useful purposes, but alas! how many girls, even farmers' daughters, are mere "*Girls of the period.*" "They toil not neither do they spin." Unlike "the lilies of the field," many are pale and sickly, more artificial than natural, and more ornamental than useful. They style farm life drudgery, but they are willing and submissive slaves to fashion.

Health is a great boon, and should be craved and preserved by every one, and a perfectly healthy and well-developed woman, physically and mentally, is the noblest work of Providence. Yet how many of the fair sex are in possession of perfect health? Echo answers, How many? With all the education and accomplishments of some of the modern girls, how many are made fully sensible of the fact that they are to act in the drama of life? Are they not led to believe, by the modern course of training, that they are to be mere playthings, tender house-plants, a package of dry goods, and a bill of expense?

Is it any wonder that farmers' sons who are chasing these phantoms are exchanging farm life for the already over-crowded professions and non-professions?

The sum total of the whole matter is this: honest, honorable, and useful labor and exercise in the pure open air are not found in the modern rules of etiquette and fashion, and, consequently, such exercises were only intended for our mothers and grandmothers.

All the duties we owe to ourselves, our friends, our country, our race, and our God, depend upon our health, for their performance, as well as our happiness. We are morally bound to preserve health, as much so as to obey any of the mandates of the moral law. But alas! where is that rare thing, a perfectly healthy woman? One whose breath is as sweet as the fragrance of a rose, whose frame is as elastic and erect as that of the roe of the forest, whose sleep is sweet and serene, whose days and nights are free from pain? How many such? And yet, this is a picture of what we all should be.

What I have said of the fair sex can be applied equally well to the *unfair* on the other side of the house. Very few are perfectly healthy, and without aches and pains. Is it any wonder? No. The great wonder is, that the people are so well under the circumstances. It requires a constitution stronger and tougher than iron and steel that can, with impunity, and continually, violate the laws of nature.

Farmers, as a rule, are too busy, and, consequently, neglect or refuse to give their daughters, as well as their sons, the necessary time for amusement. The consequence is that children are often induced to leave the farm to satisfy the promptings of nature in amusements only found from home.

If we find that amusements are taught by nature, then we should give heed to the instruction. Witness the frolics of the lambs, the gay prances of the horse, the sports of the dog, the plays of the cat, the gambols of the squirrels amid the tree-tops, the light and fantastic dances of the birds, to their own music.

What means this great joy of the animal creation, spoken out in their endless amusements, as varied as the colors of the flowers, or the forms of beauty in the clouds of heaven? What means the gayety which rings through the morning air, and gives gladness to the sweet hours of sunset? What means the joyous influence which steals into our own hearts, when we go out to make nature a friendly visit, provoking us to sing with the birds, frolic and play with the dog and lambs?

What means that spirit of mirthful merry-making inspiration that creeps through every nerve, when we meet with a company of friends who have made glad our hearts?

What means the games, plays, feasts, festivals, dances, bonfires, illuminations, which are found in all countries, and among all nations of the earth? Do they not declare that amusements are as natural as the air we breath, and as common and universal as life itself? But amusements, like rest, cannot be fully enjoyed without physical or mental exercise and labor.

A proper amount of labor, well spiced with sunny spots, is almost absolutely necessary to the formation of a firm, hardy, physical constitution, and a cheerful and happy mind. Every youth should be permitted to enjoy proper amusements, but let them invent and practice them at home.

Make education and training of farmers' daughters, as well as all other girls, broad, practical, and sensible, and not a mere vapor, or a thing that withers on leaving school, and dies with marriage! Girls, instead of being taught the art and duties of domestic life, appear to be trained simply to "live, move, and have their being" in fashionable society, and what does that fashionable society teach? Why, among the many silly things it teaches, is the saying that emanated from the devil, which is, "that we would be better out of the world than out of the fashion." Yet fashion has it so ordained that scarcely two persons can dress alike. It teaches waste, extravagance, pride, indolence, foppery, and very little common sense. It takes away all independence of a woman, and makes her a submissive slave to fashion. She must hang her bonnet behind the head, if it is the fashion. She must trail her dress in the mud, if others do. If fashion says to a woman that she must cut off her hair, (the crown of her glory,) puff and frizzle until she can imitate the uncivilized Zulu or Hottentot, she must go down and do it.

If fashion makes the shoe one size smaller than the foot, and raises the heel so as to make her walk and dance on her toes, she must grin and bear it. She is strictly forbidden to cultivate corn, but she is almost compelled to raise corns. If fashion commands that innocent children of both sexes shall expose their lower extremities up to their tender knees, it must be done, though it should cost their precious lives. This sounds very ridiculous, *but is it not true?*

If fashion commands women to contract their waists into a span, they must be obedient, at the risk of their lives. If they are asked to turn all to waist, and appear as if they had escaped from an insane asylum, they don the "Mother Hubbard," and face the music. If fashion bids the daughter to lie in bed until the mother has breakfast on the table, all that she has to do, in that case, is simply to lie still.

This is the only fashion that is easily observed, but also a sacrifice of health and precious time.

Instead of teaching our sons and daughters to "take time by the fore-lock," rise early, and sing with the lark, fashion sets the example of her first cousin, the owl, both of which feed upon their victims. Instead of teaching domestic economy, it teaches waste and extravagance. Instead of teaching industry and thrift, it sets the example of the sloth and the idler, and paves the way to hard times, bankruptcy, and ruin.

If fashion and custom bid their devotees to waste more than they can eat, it must be obeyed, though the half of this great nation be destitute and cry for bread. Here let me say, what I can properly and safely do, as a farmer and member of the State Board of Agriculture, whose duty it is to aid in devising ways and means for the feeding and clothing of the nation, that enough of God's precious gifts is wantonly wasted to feed, clothe, and educate every poor starving child of our great nation.

Fashion allows and diverts the attention of our sons and daughters from the farm, to sacrifice all that is good, beautiful, and useful upon an altar kindled with the fire of jealousy, envy, strife, and distrust. To seek real pleasure, at the shrine of stiff, cold, and formal fashion, is as wise as to try to strike fire on a rock of ice. But

> "Say of fashion what you will,
> She's prospered and she'll prosper still."

Men almost circumnavigate the globe, and pay fabulous prices to improve all kinds of domestic stock, but man, the noblest work of God, is left to deteriorate physically, and instead of offering the prize for the best, fashion puts the premium on the weak, the puny, the pale, and the sickly! It is only a question of time, when this highly refined, simmered-down fashionable society will not only look upon well developed muscle, but hair, teeth, and blooming cheeks as relics of barbarism!

God has created woman naturally beautiful, and it is her duty to beautify and adorn herself, and make herself agreeable and useful. If a girl would be good, beautiful, useful, and wise, she must commence young. If she would not feel the hand of oppression, and go about stooped and forsaken in old age, she must lay early the foundation of health and beauty and noble, intelligent independence, which will make herself reliant in the pursuit of the great aim of life.

To be at peace in heart, virtuous and able to resist temptation, is, perhaps, one of the prime beauties of a female character. But life is more than a trial of virtue. It is a great work, and in this work she must possess energy, as well as purity. She must dare to face false and foolish customs and fashions, dare to assert her rights and do her own thinking, dare to be above silly pride, whims, and nonsense.

Woman appears to have very little independence she is a slave to fashion, and in marriage she is to be subject to and become one; with her husband, and her husband is that one. This is her present position, and to rise above this position, requires culture and energy.

All things are advancing; what was once regarded as sufficient for a woman is not enough now. Once it was thought that a woman had education enough if she could read and write a little, but more is now required in this progressive age.

The honorable vocation that farmers follow should entitle all their sons and daughters to a good practical education. They should be well supplied with books and papers, so that they can rise as high in the scale of intelligence and social enjoyment as children belonging to parents of other occupations and professions.

Again, the social and political positions that farmers generally occupy have a great tendency to drive their children from the farm. Men and women are social beings, and farmers, as a class, do not associate enough to make life sufficiently happy and agreeable to the young. This is another source of discontent. And again, farmers' sons, with honest ambition, a future, and the world before them, have very little to encourage them to stick to the farm, when they see that farmers, though the great majority in peace and in war, stand away back at the public crib, and take what is put in the rack for them. And even the fair sex have an honest pride, and want to be somebody, or at least somebody's wife. That is the reason why so many of them leave the farm and join themselves to dudes and dandies of the *light brigade.*

Male or female, rich or poor, high or low, should have some honorable and useful employment to exercise mind and body, and this should be chosen early. The young energy should be directed to it, enlisted in it, and harmonized with it. It is through useful industry and labor that the rarest beauties and force of character shine. And no woman of genius and character will eat bread, wear clothes, ask for shelter, education, and protection, without helping to produce it.

THE EDUCATION OF FARMERS' SONS AND DAUGHTERS,

By Mrs. Mary V. Bowman, *Nanticoke*, *Penna.*

(Read at the Bloomsburg meeting.)

My desire to see farmers' sons and daughters educated into fine types of broad-minded, strong-natured manhood and womanhood, influenced me to accept your courteous invitation to write a paper for this occasion on the "Education of Farmers' Sons and Daughters."

Proteus, the story goes, could assume many shapes to escape the interviewer. His many sons and daughters, no doubt, inherited his propensities, and passed them on to succeeding generations. When members of the family first came to America is not clearly ascertained. Perhaps with the great navigator, whom they may have granted to be now Colombo, and again, Colon, or Columbus, and to lie buried at the same time in two different places, for a perplexity to the archæologist. However that may be, here they have been found in increasing numbers ever since, assuming forms, corporeal and incorporeal, as multiform and elusive as their great original.

According to all accounts, Proteus must have been a most exasperating person, and certainly his descendants have proved like him, a perplexity and a plague. That they should be such to the rest of mankind is not surprising; for, like the dwellers in Plato's cave, they are for the most part satisfied with the shadow, ignorant or indifferent if there be a reality beside.

Strange to say, the foes which baffle us are often of our own household and among closest friends. You have a suspicion that all is not honest about them, and that they are but the shadows of some cunningly devised scheme of wrong, and conceal their identity. With the best motives, however, we may well consider whether the gain resultant can compensate for the loss and confusion which are likely to arise.

Hence, we must take humans at their face value, and regard them as what they claim to be, and do that which seems best in view of the peculiar circumstances in each individual. But while my sympathies are enlisted in the best interests of farmers' sons and daughters, yet I am tempted to make this short and pithy quotation from St. Anthony's sermon to the fishes:

"The pikes went on stealing,
The eels went on eeling,
Much delighted were they,
But preferred the old way."

On reflection, however, there is advanced thought among farmers regarding the education of their sons and daughters, and many think, as a wise old book says: "The world is saved by the breath of school children," and desire to make this breath of life sane, strong, and pure. He was prudent who, in answer to the cant about not prejudicing a child's mind, replied that he would prefer to "prejudice" his garden plot in favor of strawberries than leave it to chance of purslain.

It seems to me education is commenced at the wrong time. It should begin in the cradle, and that presupposes educated mothers. It requires years of study and preparation to fit persons for success in secular trade or profession; if they set up in business without careful preparation, we would wonder at their audacity. Yet, how many parents are ignorant of their duties, and have not given ample time to preparation for a life-work requiring such a diversity of gifts, and involving so much responsibility in spiritual and secular things! The best men and women of the past and present are those who have had educated mothers; truly, "the hand that rocks the cradle moves the world."

Mothers do not discriminate, do not observe the different treatment necessary in educating the vigorous and the weak child. Many have not informed themselves at what age education should commence; and that the powers of growth must not be interfered with, but observe cases commencing earlier with some and later with others, and not allow time to pass by to make good and useful impressions if it can be done with perfect safety to the general health, and that the mother education consists in developing the articulate capacity, in cultivating an interested observation of surrounding persons and things, (for the activity of the eye is very early,) and the child should be taught to connect names with the various objects, and mothers should realize fully that the further they advance a child in these three branches, the better is it fitted for the more methodical instruction of the school. But, say mothers, "Oh, it takes so much time." Why, just think of it—they are rearing men and women who are to live through time and eternity! They should not let their children be left to the chances of unreasoning custom, impulse, fancy, and the suggestions of ignorant nurses and prejudicial counsel of grandmothers. Parents should get nearer to their work; away with doing it by proxy! "Every man is a debtor to his profession," and in no position in life is it more true than in mothers and fathers; their personal influence, where does it end? It has been well said: "It is only the educator who can appreciate the influences which have gone before his own, which are running parallel with them, and will come after them, that is in a position to judge of the course to be pursued."

And now, the only hope of improving our schools is by improving our teachers. Here is the first step for the advancement of popular education. Good schools, through the administration of ignorant and unskilled teachers, are impossibilities. You cannot get good teachers for small pay, and school-directors and others should take for their consideration the reply of a certain irate domestic to her remonstrating mistress: "You can't expect a good cook and all the Christian virtues for two dollars a week." The personal equation of the teacher may easily become the exponent of the power and influences going out of the schools, and what an inspiration it is to that well-qualified teacher and mother if there is a chain, and every day an added link, from the home to the school! Farmers have on their table agricultural newspapers and magazines in which they glean how best to raise cattle, and are their children not of greater value? and is it not as necessary to have educational journals also on their table, and therein study well how best to rear their sons and daughters?

Let us glance at a few definitions of education. We find the ideal of the founders of the Prussian national system is given shortly as "the harmonious and equable evolution of the human powers." James Mills says: "The end of education is 'to render the individual, as much as possible, an instrument of happiness first, to himself, and next to other beings.'"

But happiness is not the end of life—character is. Hence, there should be symmetrical development. The improvement of the spiritual, mental, social, and physical condition of the sons and daughters of farmers entitling them to the respect, confidence, and closer sympathy of the community and public.

Look how the plant develops; it first breaks through the crust of the earth, it keeps growing, and presently a leaf pushes forth toward the rising sun, then another toward the sinking sun, expanding, assuming beautiful shape, webbed and veined with delicate arteries; other leaves follow, one above another, until it becomes a beautiful plant, and we see, waving and nodding upon its crest, a full-blown rose of color, dyed in the sun, fragrant with the breath of perfume.

But there is the *peculiar isolation* of farmers' families their sons and daughters are withdrawn into a world of their own. They feel out of practical relation to the community, its affairs and enterprises of the surrounding country and adjoining towns; hence arises selfishness, and also the prevalence of that pernicious idea that no direct and efficient service to public affairs, no immediate or future eminent usefulness to others, is, or will be, expected of them. And just here lies the opportunity of the *State Board of Agriculture* and the *granges*, they are potent factors in the success to be obtained, in that they can go into these easy, wasteful, purposeless lives, and challenge them to make their own little world broader. Inculcating larger ideas and a higher conception of their privileges and duties, into the secluded lives of the youth they should go, as an inspiring, ringing voice, bidding them become upright, manly, and womanly, and by the influence of their lives, show that active, intelligent, coöperative effort will receive first recognition.

The opportunity turns upon another feature of our youths on farms, *their quick sensitiveness to any noble plastic power*. Youth is peculiarly open to external influence; then should they be in daily contact with noble teachers and studies; they should attend an agricultural college. There under efficient, careful instructors, they can pursue a course of study that has been carefully and wisely planned; they should also take a commercial course, and, after leaving college, should not think their education finished, but continue gleaning more knowledge daily, and choose that profession or calling in life to which they feel themselves best adapted, remembering that every man and woman is only efficient and powerful when in his and her place. We need only look around us to see how many are out of their places.

Now, if every member of the State Board of Agriculture, and of the grange, would elect himself or herself a committee of one to attract, by influence and word, our sons and daughters to their duty and privilege, what a change there would be, and there would come forth after a while, from these young men and women, an influence for great good in the nation, State, county, and locality in which they live. There is a word they may speak, and a time when they may speak, and a way in which they may speak, the influence of which may go on into the far future. There should be many farmers' sons and daughters here to-day. Whose fault is it they are not here to imbibe beneficial instruction? Let each one question him or herself, have I lived up to my opportunity? There is earnest, courageous, hearty, personal work each one of us has to do, if we desire to see farmers' sons and daughters attain usefulness and eminence in this country. Our youths must be under the fostering care of our State Board of Agriculture, our granges, and agricultural colleges. These are the vital nerve centers of the social system from which shoot out into farmers' homes lines of powerful mental and moral force.

It should be impressed upon the youth that intellectual cultivation is no mean factor in those influences that mould and change society, and that our educated men and women will always be the dominant forces in our national life. "Knowledge is power." It has been said by a gifted educator: "The scholar, the priest, and the soldier make up history: the scholar, to think and plan; the priest, with holy fervor to feel and pray, and the soldier, with daring to do."

Look at the records of history, and see the part which farmers have played. In the earlier period of our nation, they were elected Presidents of the United States, Governors, Chief Justices of the United States, and their wives have been the first ladies in the land, and presided, with grace and dignity, in the White House; but when we come to later periods, how great the falling off! They have been sinking more and more into obscurity, until our youths think there is no distinction in life to be obtained if they pursue the avocation of farming. Will not these lessons, written upon history's page, stir the hearts of the sons and daughters of farmers, and incite them to greater effort, and to loftier ambition? The youth of to-day are stepping upon the field of action at a time when the world's life beats with quickened pulse. Let no man despise their youth. It is cast in the grandest country to which the ages have given birth. It uses that language which is fast becoming the current coin of the world's speech; and it has fallen upon a time distinguished for its daring ventures, splendid opportunities, and towering successes. It fronts the sublimest issues of human history, and the most stirring battles of human hope, and the opportunities of the youth in the present day are enough to thrill our spirits with joy. Archimedes declared that if he could only get a place whereon to stand, he could take his lever and move the world. The opportunity of agricultural societies, farmers' institutes, and agricultural colleges, is the place whence we may move, not the material globe, but great races of immortal men and women.

Now, a decided influence in behalf of the education of farmers' sons and daughters may be exerted by notifying them that they can have access to reference books, such as encyclopedias, biographical dictionaries of mechanics, etc., in public libraries of surrounding towns, and in grange libraries. I would recommend to the student a little book by W. E. Foster—"How to Use the Reading Room." There can be established direct communication between libraries and schools, making schools branch libraries. This can be done by insisting that teachers in country schools shall know something of literature, and by refusing to grant certificates to teachers, who, in the course of an hour's talk, do not show themselves well enough informed to guide children to a love of good books. Daily newspapers may be used with advantage in schools to encourage children to read on current events and to verify references. Again, the secret of the surest way of a teacher gaining over children is this.

Teachers should like children, and they should never be too busy to talk with children, and find out what they need. Children need a winsome friend, to meet them more than half way, patiently answer their questions, and, by slow degrees, subdue them to the useful and the good.

Every young man and woman who is anxious to become intelligent and well-informed, should buy a good encyclopedia, a good atlas, a good dictionary, and hold power in their hands. All workmen must have suitable tools. What would one think of a carpenter who came for a day's work bringing only a saw with him, or a dressmaker who owned no scissors? Hence, to have a real desire for information, and not have the proper reference books, is nearly as absurd.

Where farmers' families are too poor to send their sons and daughters to a normal school or an agricultural college, there is the Chautauqua Literary and Scientific Circle, universally coming to be regarded as the greatest movement of the times. I will read its circular, that you may understand its aim and methods. I am happy to be a member of the class of 1886. I have found going through college at home most inspiring; fortunately, I can meet one evening in every two weeks with students in a town within two miles of my home, where they have organized, elected officers, and where questions are asked and answered by students on the lessons. So I wouldadvise our youth on farms to unite in purchasing the books at club rates, and meeting at each other's homes, or some central place, once every two weeks. Organize a Chautauqua Literary and Scientific Circle, and recite and talk over the lessons with each other. This Chautauqua Literary and Scientific Circle course will give them a push in the right direction; will put its moral and intellectual pinch bars under their activities, and start them on the right course. They can get their storage batteries charged with electricity enough to give light and power to many scattered homes. In the aggregation of such individual efforts, there must come a universal conquest. I would recommend the young folks on the farms, also, joining the Chautauqua Town and Country Club.

Now, a few words for girls. There are many impossibilities in the world to them, but there is one thing possible: they can become women in the best sense of the word, and arrive at full womanhood in some sphere. The age demands sterling women-workers—such as abounded in the early days of the Republic, or the early days of any civilized and powerful nation.

One lady of Rome showed her jewels, but the mother of the Gracchi pointed to her two children as her jewels. To whom do we owe the preservation of the New Testament but to the heroic girl-martyrs among the first Christians, who endured unheard-of tortures rather than betray the hiding-places of the sacred writings?

Martha Bratton helped hand and heart in establishing the freedom of our country, her husband a colonel in the Revolution. The women of the Revolution helped to make heroes and statesmen of the men, and all remember what women did during our civil war, and the aid they gave our Centennial. When Napoleon discarded Josephine, he went to ruin. The name of Semiramis, who formed the hanging gardens of Babylon—a combination of beauty, wealth, and power that Cyrus could not destroy. These were heroic women, and many others might be mentioned. It shows the grand possibilities of woman. The true woman is the fountain-head of social, moral, and religious influence, and she will be strong enough in soul to advance to her legitimate position in the world. If there is anything that demonstrates the civilization of the nineteenth century, it is the education and advancement of woman. Farmers' daughters should take hold of the grand possibilities and opportunities before and around them as flowers sprang up at the feet of Proserpine. And sons and daughters of farmers should be taught that every man and woman is only efficient and useful when in his and her place. In following the avocation in life to which they are adapted, they will preserve their individualities.

I do not suppose that all will find the places to which they are adapted, or that, in many instances, Maud will marry the judge. I care not whether their work be that of the head or hand; whether the world call them noble or ignoble. If they have found their place, and envolved out of it its and their best possibilities, they are happy and useful.

Farmers, teach your sons and daughters that, in the conflict of life, it is a question of brains, power, adaptability. That many lives are failures because they are out of their spheres. It is better to be a fifth-class something than a first-class nothing. If farming be their choice, they should avail themselves of the study of agricultural text-books, and bless the day that Gutenberg and Faust saw the light, that, by the invention of the art of printing, they may have access to rich literary treasures, and avail themselves of the golden secrets that delight whilst entertaining our better life.

THE FARMER'S FAMILY—PAST, PRESENT, AND FUTURE.

By MRS. F. M. EVES, *Millville*, *Columbia county*, *Pa.*

[Read at the Bloomsburg meeting.]

In a retrospection of thirty years as part of a farmer's family, residing in one of those beautiful valleys of central Pennsylvania, separated from the busy outside world by those dividing ridges that form the Allegheny range, but have not yet aspired to the name of mountain; reared under circumstances perhaps quite as favorable as those of farmers families by which we were surrounded, we love to recall that primitive life and that of the generation preceding our own, its simplicity and economy. The hand-to-hand struggle to provide for and educate a large family, the privations, and lessons of endurance and hope, held in reserve, have been marvellous helps in after-life.

In those farmers' families of the past, sacrifices were made, habits of reflection formed, and seed sown which has produced the advanced thought that has brought to bear upon every avenue of art and science, and has culminated in innumerable inventions to lighten the toil and lessen the labors of the yeomanry of our land.

To those unpretending farmers' homes, we are indebted for such men as Washington, Lincoln, Greely, Whittier, and a long line of kingly men and noble women who rose above their fellow-men, whose lofty aims and noble deeds and aspirations have made the world better, the surroundings pleasanter, and produced opportunities to satisfy the thirst for knowledge, which had been denied them, possible for those that followed. In the farmers' families of the past, integrity was the watchword, toil the constant experience, idleness almost unknown.

In the years 1794 and 1796, efforts were put forth in this State to establish a State society for agricultural improvements In 1800, was held the first national agricultural society at Georgetown, District of Columbia, for the promotion of domestic and rural economy. The farmer's family of the present are the recipients of the important results of those early efforts in the State Board of Agriculture, literary societies, reading clubs, and public libraries. All are the outcome of the needs the farmer's family of the past felt and strove to overcome.

As our representative men assemble, to discuss the merits and demerits of subjects pertinent to intelligent husbandry, new questions continually rising before the old can be answered, do they ever discuss a subject exceeding all others in importance, and upon which depends their success or failure in life? Do they discuss how to promote the health, comfort, and education of their families, how to provide homes of taste and refinement, surroundings that will impart a good influence, mould the thoughts of the young, and prepare them for the warfare incident to daily life? Pardon me if undue stress is placed upon this. The responsibilities of the present cannot be ignored. The farmer's family of the present will furnish the recruits in the future, as in the past, to the Executive mansion, Senate chamber, legislative halls, to the ministry, editors' sanctums, law, banks, and mercantile offices; and in the retirement of rural homes are growing up daughters, worthy to be the helpmeet of such, who will be qualified to give judgment in all that constitutes the individuality of woman. The earnest, thinking farmer's wife and daughters of the present must lift their communities to higher planes of thought, and maintain the ground they have now won by forcing their way into the higher walks of literature, and make the way easier for succeeding generations.

From the farmer's families of the present, in possession of a rich inheritance from the past, we will pass to the farmer's families of the future; from this age of invention to the age of culture, and draw aside the mystical veil, and invade this ideal realm of the future, to find that the possibilities of the past and present will, in the future, become realities. Without recapitulating, we will remind the farmers present of unperformed duties. Surely, the wisdom of the generation we have just passed from will protect the farmer's family by wholesome laws that will control or subdue the awful traffic of intoxicating liquors that blasts the hopes of many families, and casts a shadow over every heart. The culture of the tobacco plant will also be prohibited by law. Its pernicious use will no longer impair the physical and dwarf the intellectual powers of those upon whom the burden of maintaining this government must rest.

The question of the inferiority of woman will no longer be mooted. Time, women, and intelligent men will have grappled with and settled it. In her true sphere, she will, in the future, be the acknowledged equal of man in religious, domestic, and civil affairs, and in all of the reform movements and lawful avocations of life.

Compulsory laws will exist in regard to attendance at public schools, where industrial training will form the true basis of all teaching. This kind of training will help all to become self-supporting, and thus suppress vagrancy and crime in this favored era. Protection to the sanctity of the homes scattered over the great prairies of the West, on pleasant hillsides and lovely valleys of the East, will be secured. Then, indeed, will the farmer's family become the bulwark of the great Republic. His will be an Arcadian life, such as inspired the poet Longfellow, and we will all aspire to that "true grandeur of nations" of which the gifted Charles Sumner had prophetic visions, and, freed from the harassing cares and anxiety of city life, will form such home centers that no member will ever wander from their overshadowing arch.

"No cherished good has earth,
So dear to man as home, wife, children. All
It holds beside, to him is little worth,
If these he may not call
His own, by right divine.
And woman loved, whatever else she lack,
With husband, children, gathered at her shrine,
Wins the lost Eden back."

FARMERS' DAUGHTERS.

By Miss REBECCA J. CONARD, *West Grove*, *Pa.*

(Read at the Oxford meeting.)

As we rate ourselves among the farmers' daughters we naturally enough feel a lively interest in the race, and believing them to be creatures of influence and worthy of notice, and whose influence is yearly growing in worthiness, we venture to give a few moments in their behalf. Farming and farming interests have been upheld by masterly arguments during the sojourn of this company, and we girls must prove ourselves not without our influence and usefulness among them. In general society, farmers' daughters have stood in the background, and perhaps not without reason; but these reasons are dissolving as dew before the sunshine.

In the earlier ages of our forefathers, farmers, for the most part, lived to themselves, remote from intercourse with the world; their little world consisted mainly of their homes and a few neighbors in like station and habits. Education was thought of less importance than now, both for boys and girls, especially girls. Did they grow up to be workers indoors and out, knowing little but home-spun and the every-day routine of duty, with but a meager schooling, the great aim was accomplished. This, doubtless, has given rise to the feeling that, country girls are not to be compared with the more favored ones of town or city.

In these times of intellectual growth and advancement, such is not the case; the young woman reared in the country has every opportunity of standing among the highest in her time. The world of improvement rolls on with rapid strides, and girls, there is no more grand and ennobling place to live than on the farm—in the free open air, among nature's own beauties, where virtue and health and intellectual culture are handed out at every turn. The glories of the sky, and earth's countless flowers and birds and hidden treasures, are sacred to the lover of life. The day has gone by when the odium of ignorance can be placed at the door of the farmer's daughters, as they are having every educational advantage of the age. The facilities by which farm work is made simpler and less laborious, which are constantly being brought into use, gives the farmer much better opportunity to educate himself. Such meetings as the present and hosts of farmers' clubs that are scattered through the land, the extended scope of literature, the lecture field, all tend to his mental improvement; and hence to the children do we see meted out in just proportion, culture and refinement. Where will we go to find a class of people of more general and substantial knowledge than among the careful farmers' families of the present day? Business men of city life, whose time is mostly spent on some specialty, are, and must be, devoted to that one purpose. While this is wise in a business outlook, it is curbing to every other improvement of mind, so, while a certain amount of society embellishments adorn him, the thoughtful farmer, with his quieter opportunities and surroundings, is, perchance, far the better informed in science and technicalities.

In the present day, our farmers' homes are pictures of comfort and pleasure, and there is to be found much of the artistic and beautiful in their adornment. Music, in its best culture, and other accomplishments and entertainments are there, making homes any one should be proud to live in. Again, the full and generous larder of home products, choice fruits of the season as they come; the culture of plants and flowers, the morning work among these treasures of nature's gifts; the many beautiful and refreshing walks and rides incident to farm life, are healthful and refining; while it mantles the rose of fresh life upon the cheek and brow, gives vim and tone to the whole mind and body. No other business gives the opportunity for sociability. Nowhere else can the father, husband, or brother take a day, or part of a day, now and then for pleasure with his family and friends in the many ways the farmer can. If our farmer's daughter who may sometimes murmur and think her lot lays among hardships, could only peep into the life of the city girl of medium station, and see the toil which underlies her more fashionable appearance—the trudging to market through dirty streets and every kind of contaminations; the constant call upon her time and strength to attend to the countless errands and calls of everybody; the scanty food as it is supplied from the market basket, in comparison with the farmer's table; and as she works, perhaps hid away in some back kitchen hemmed in on every side by high walls, where the sun scarcely ever finds her, and where no green can refresh her, breathing the still, dull air, she would not murmur, but thankfully hope she might always have her country home, and be proud that her lot has been cast among them. The more we learn of life the more emphatically do we find this is true.

This much for our farmers' homes and opportunities, and now to the girls of city or country, let us for a few moments see what our duties to ourselves, as women, to the world, as helpmates, to society, as a purifier, may be. First of all, employment for a purpose, a legitimate aim, is essential to a true woman. Away with your simpering girls who are afraid to allow themselves to do anything for fear of stepping out of the lines of propriety and ladyship. Such are not the ones to diffuse comfort and happiness around, or to make for themselves the life they sit and dream should come to them. Employment is essential to all improvement, mentally or morally, and at the present age there is an endless number of avenues open to their acceptance, in which they can enter in the full dignity, grace, and culture of the real lady. We consider that in nothing in society is there a greater mark of growth and progress than in the fact that we may make a legitimate livelihood and yet maintain the true dignity of our womanhood.

There is room on the farm for girls to make a good maintenance with the chickens or dairy. Our colleges, or their equivalents, are giving us the welcome hand, and woman is ready to grasp it, and will bring credit to their records. They can grace the professorships in science, literature, and metaphysics with a clearness of intellect worthy the high position of their calling. Though the years are but comparatively few since woman was bound down to the prejudice of rank and appearance to believe that nothing outside of household and maternal duties were consistent with her sex or supposed amiability it secured, now, where are the most amiable, the truest, where the highest development or the best type of womanhood to be found? It is among the cultured, among those whose lives have been devoted to the development of her powers in whatever path they may have been thrown. Where cultured womanhood is found, there may woman's virtues and woman's best influence for good be found. It is she who molds the youngminds given to her care with a better purpose, a more comprehensive knowledge of the future needs of her children. It is she who gives to the world a growing generation that will advance in progress and wisdom after her day of usefulness is gone.

But to the girls in their individual appointments, what a world of happiness is theirs, who use their opportunities compared with those who lie waiting for the driftings of the tide to bring something to entertain them! Teaching is an old field, a worthy one, and one long to be filled by us—a calling for which women are peculiarly adapted; but, in the present times, manufactures, telegraphing, and clerking in its thousand different forms are also competently filled by ladies. Art is now especially engaging the attention of American ladies, and developing a new sphere of work. Formerly, works of art were mostly done by the people of other countries, but we are finding out we have minds capable of doing our own work. Schools are now established for the perfection of such work. The industrial art schools have opened an endless field for remunerative employment in this country. As examples of what may be attained by us, I mention a few shining lights who have risen from just such lives as many of our farmers' daughters are living.

Rosa Bonheur found her life-work while playing in her father's clay quarry, modeling her pets, the calves and sheep and dog of which she was very fond.

Emily Faithful arose from the ranks of those who worked for their living, and to-day holds in history the name of doing more in her time to improve the condition of women of the laboring ranks of England than any other person.

Frances E. Willard spent most of her time, until seventeen years of age, in the free, rollicking, happy life of roving and playing among nature's charms, as she sought and enjoyed them on the farm between her hours of labor. As she came into the world, receiving her education and mingling with her fellows, her attention was strongly drawn toward the girls, and many valuable articles and lectures have been given in their behalf. The great work of temperance called upon her conscience to go forth in its behalf, and at present she is recognized as one of its greatest votaries, and stands to-day leader of this great band of women known as the Women's Christian Temperance Union, and is doing a work that will live long after her.

But we do not need to resort to the pages of history to cite noble, sacrificing, capable women who have lived great and good lives, leaving their wave of influence "to extend and widen to the eternal shore."

Sisters, we hope we may have lent you encouragement to broaden out in the field for which you are fitted. Press on, and success will crown your efforts. Let us endeavor to make for ourselves the life which our abilities and talents show us was intended for us; and, stepping from the arena of life, realize that our lives are the best we could have made them.

INTELLECTUAL CULTURE OF FARMERS' FAMILIES.

By MRS. MARY BOWMAN, *Nanticoke*, *Pennsylvania*.

[Read at the Bloomsburg meeting.]

> "Men and women make the world
> As head and heart make human life."

All gifts to the individual imply by their very nature individual responsibility. We should help each other to live out the best that is in us. Character-building is to be the new basis of life. It is a broad platform, and on it education and religion, the school and the church, meet. A woman eleven years ago said, "Women must exist as an individual." The sentence strikes the key-note of the age. It condenses in itself the philosophy of the realization of woman's highest possibilities. Men and women eminent as thinkers, as scholars, as inspirers of the world's work, and as factors in the progress of the age. The anniversary meetings represent all the interests of the day, and a mere *resume* of the objects of these associations, and of the topics discussed, is a suggestive commentary upon the tendency of modern thought. There are many currents and under-currents, but they find their unity in the ethics of life. Ethical culture is a leading aim of the day. It enters as an elemental force into all the progress of society. In this crucible of higher thought, barriers between the different kinds of work are burned away. Two of the greatest obstacles to spiritual advancement—prejudice and intolerance—are melting away in the fire of the real, of earnest purpose.

And there are those who have rapt enjoyment of advanced ideas of any transcendental elevation. The spirit of the age is working for us. True, there are some who have very little grasp of principle, even from the natural temper of their minds. They see this thing is beautiful, a second is expedient, and a third is pious; but of the connection one with the other, their hidden essence, and the bearing of external matters upon each and upon all, they have no perception, or even suspicion. They do not look at things as part of a whole. They delight more in their own conceits than in the truth, and remind one of the man who wrote affectionately on the tomb of a friend, "As a truth crusher, he was unrivaled." Truth, whatever it is, is the law of nature. Take wheat, cast it into the earth; there is chaff mixed with it, but the just, kind earth grows the wheat, casts aside the chaff. Truth is the law of God; ballots nor bullets could never make slavery settled, it was wrong. There is more power in conscience than in steel. Truth is so manifold it is impossible to get it all in one church; each church may have great measures of truth in it, but whatever is best in each will survive, according to the law of the survival of the fittest. The longer we thresh things, the more do they yield the pure grain of truth. Investigation will not do any harm. The sea-shore's crested waves look like walls of adamant as they come near us; they break up the beach into numberless drops, and roll them again in confusion into the sea. What would have surprised our fathers does not surprise us. Grown-up Baptists are asked, and actually become, godfathers to Episcopalian babies. What terrible confusion is here! But out of it will come the ideal life, the charity that hopeth all things, that beareth all things, that is kind; the large, wide out-look from another's stand-point. May all denominations of Christians, and all nations of earth, come nearer to Him who is the one center, and reflect His glory and His beauty, until, being transformed into His image, all shall be prepared for eternal fellowship with Him.

It is a great thing to be a living human being. A farm may be a great thing, but man is greater than a farm. "The earth is the Lord's, and the fullness thereof." But He has made it for man. A man's character is his own, not so of his nose; if he had hadh is choice, he might have selected another nose; but his parents, aunts, and uncles, may have had just such a nose. Not so of a man's character that is absolutely his own. Early surroundings may have influenced more or less.

Dr. Hammond, in his essay, "The Coming Man," in the March number of *The Forum*, says it is alleged that eventually all men will be constituted as are the angels that the idea is widely prevalent that angels are supplied with wings growing out of the body at the situation of the shoulder-blades. And one advanced philosopher goes so far as to allege that within the historic period there has been a development of these bones to such an extent as to indicate, very clearly, their ultimate destiny to be fully elaborated into wings. That there is implanted in the human brain an ambition to be endowed with the faculty of being able to fly througn the air, is very certain, etc. Yet, it seems to me, it is better to be a man than an angel, because Godhood is forever associated with manhood. God came to earth and clothed himself in man's form, and when He ascended to heaven, methinks he would, inch by inch, have taken off man; but no, He wrapped humanity around Him, He took humanity with Him back to Heaven, and as the drops are gathered from the ocean and caught up into the clouds, so will we be caught up into glorified bodies. How great our destiny, and how necessary that every one should aim for that condition of mind, in which it seeks earnestly for the highest and purest truth. There will be blunders and failures, but they are the school-teachers of the world. Patient seeking after knowledge will be followed by a deep and earnest reverence for the greatness which is above, and an inward assurance that our aspiration has not been in vain, that it has brought us a little nearer the Supreme Intellect. Here is the secret of that fascination which belongs to the intellectual pursuits, that they reveal to us a little more of the eternal order of the universe, establishing us in what is known, that we acquire confidence in the laws which govern what is not, and possibly never can be known. What a grand picture is manhood! How many, think you, reach up to the Bible measure? If "the righteous scarcely be saved," where, oh! where, will the dude appear? One is not surprised that a boy from the country standing on the corner of Broadway and Fourteenth streets, New York city, said to his father, "It beats all how we see things when we've no gun with us." And there, too, is Miss Dudeism the one object of her life is the wearing of clothes, sacrificing the immortal to the perishable. I saw a dude the other day, and he tried to look like Henry Clay; well, he may have been—with the Henry off. It is sad, indeed, to see any one who has not a mind above a moustache, a necktie, and a fashion plate. Let us hope the young American Hercules will strangle the American snob. Then there is such a thing as being so good as to be good for nothing. Woe unto the man who stops to pull on his gloves! Idle men ought to have lived in another age than this, where a man can eat his breakfast in New York, his dinner in Chicago, and his supper on the plains. Idle men are born too late. Talmage says they will die too late.

There is an idea, however, among some, that intellectual pursuits derange the health. The teachings of the most advanced physiologists of the time, and practical suggestions based on the experience of intellectual workers, concentrated within the briefest expression, is this: that mental labor cannot produce disease, but may aggravate the consequences of disease which already exists. The effects of a sedentary occupation should be counterbalanced by invigorating exercise—daily, if possible. Hurried traveling to the seashore or mountains, where often recreation is dissipation, is not so good as to get the week's supply of recreation during the week. You know the fable of the Sphinx of the ancients. Well, Nature is that sphinx. Solve her riddle, and she cannot hurt you; impose on her, and she will punish you; neglect exercise, regular sleep, judicious eating, and there will, in time, be a fearful balance-sheet for settlement. We learn that the laws which determine human well-being are fixed and absolute, as the law wears, Janus-like, two faces; but it is one law, nevertheless—assuming, however, a two-fold sanction, awarding obedience and punishing disobedience. The sedentary student is pale and nervous. the plowman has a healthful glow. These results are not from two antagonistic laws, but of one law. But I am reminded of the beauty and wisdom which exist together in Goethe's gem-like stanza:

"Wie das Gestirn,
Ohne Hast
Aberohne Rast
Drehe sich jeder
Um die eigne Last."

(Like a star, unhasting, unresting by each one fulfilling his God-given hest.)

Heed the wise restriction about haste, and forget not the limits of human nature in following the example of the star. How often the ambitious student never rests until nature mercifully closes his eyes in sleep. The happiest life is that which exercises and educates what is best in us. And from testimony, we know that there can be a satisfactory intellectual life under the various conditions of ordinary human existence. We learn that some of the best intellectual lives had to contend with unfavorable influences, and in this busy generation, when the hurried man or woman grumbles that "all the time there is" is not enough for them, the librarians of our public libraries make time for them by saving it, for a minute saved is a minute added, and this function of organizing, of time-saving, of thought-saving, is associated peculiarly with the librarians of this day. And it will be a chief glory of the nineteenth century that it has organized knowledge, and the man of the future, who will have more to learn, will learn it more easily. With classification, there is no longer confusion. Now, all who are born with considerable intellectual faculties are instinctively urged toward the intellectual life, as a duck is urged to water—it follows its instincts. But the intellectual man's life is never perfectly in accordance with his instincts. There are no lives so exceptional as to escape many impediments, although the ignorant imagine that the intellectual man is so placed and endowed that all his work is easy, but it is well known that too much facility is unfavorable to intellectual growth; personal persevering will master tasks. The intellectual life is a discipline, or a contest—a perpetual evolution, unfolding of the mental powers. A process of evolution—a pressing forward to perfection.

Most men die better than they are born. The art of living intellectually does not consist in surrounding ourselves with statuary, and paintings of the great masters, although it is said such surroundings produce refinement; but I am a heretic upon the subject, having observed their non-effect upon certain natures, and believe that a man whose inner life-thoughts are beautiful may be a connoisseur in art, although he may not know the meaning of the word.

The school of the farmer's family is where they happen to be, and the teachers are the people and objects round about them. They can gather lessons in language. grammar, and rhetoric from the everyday words that are spoken in the household, and by those whom they meet, and communion with persons of elevated minds is of inestimable advantage. Life is expression. Then the more truth we are able to express, the more influential are we. I do not know how the farmer's family can learn all the great truths of mind and matter in this world, and when you don't know a thing, it is best to say so. But I believe that God had a reason for everything He did and does, and that whenever He withholds anything from anyone, it is for the best. We must go on to perfection, and as the mind becomes able to understand, He will gradually unfold His purposes to those who reach out after them. There are many persons who must believe facts as recorded, although they do not understand them. Think of William A. Gladstone, with his far-reaching mind! If he and John Ruskin were spending an evening together, how do you think they would engage themselves—in reading Mrs. Braddon's last novel? That would be recreation after severe thought and interesting? A light frothy skim? Oh, no! Methinks they would grapple with the most important theme of the age, each one giving utterance to most profound thoughts on the subject. Compare these great men with Plato, a plate-broad, then the Lord, greater than them all. Oh! let all strive to keep close to the truth, and not be buffeted about by error and falsehood.

One need only observe to know that any man or woman of large natural capacity may reach an intellectual tone of thinking; and what is the essence of intellectual living? It is a preference for higher thoughts over lower thoughts. Thinking, reasoning, developing—finding delight in the world of truth—and by the processes by which it becomes their own. I am not speaking of the highest culture for all, for that requires years of labor that cannot be spared from a life of practical industry. The very fact of the isolation of farmers' families may compel greater self-dependence, and call forth a larger measure of native power. The discipline by which the will brings all other powers into practical submission and service is the best end of an education, and out of it comes mental, executive, and moral force.

All who can read English have greater access to learning than had men of ancient times, who lived when science scarcely existed, and there was little literature as an aid to culture. Yet, Solomon and Aristotle lived the intellectual life, and Plato thought intellectually.

An acquaintance with nature is of great value in the cultivation of the intellect, and farmers' families are favorably situated in this respect, and as sight and hearing are the two senses most necessary to intellectual culture, then those who are healthily sensitive to every kind of pleasure cannot fail to be influenced by the spirit of nature, and its suggestions will have great effect upon their thinking.

And the two great powers of the mind, reason and imagination, can be wonderfully cultivated together. Intellectual farmers' families can enjoy the glory of sunshine and sunset. The cool, inspiring breeze stirring the leaves and freshening the air, the sparkling, running water, the perfume of a tree in the distance; yes, the intellectual dwellers in the country can cultivate their hearing so that they will enjoy listening to the different voices of the trees on the lawns surrounding their homes, and will be delighted as they listen to their bass, alto, soprano, and tenor voices. They will listen to the winds whispering to them, and feel a sympathy with the shrieking and the moaning winds. History tells us that the first attempt made for the improvement of intellectual education was that undertaken by Socrates and Plato. They aimed at the improvement of the intellectual education of their countrymen. At that time the ascendency of the Sophists was immense.

In the course of ages, Plato's writings have superseded theirs. Socrates and Plato contended successfully against these teachers called Sophists. The sympathy of all posterity has been with them in their opposition. Socrates' cross-questioning when he tried to get them to tell what it what it was to speak well and to act well. They could not tell Plato what was that "First Good, First Perfect, and First Fair." These were some of the demands, as you will recollect, that recur again and again in the Platonic dialogues. This is the tendency of all the trains of logic which are said to emanate from Plato's imaginary Socrates. What do we know? How do we know it? By what reasoning? From what principles? Farmers' families, as well as others, should remember that to acquire high intellectual culture is not easy; for of all work that produces results, nine tenths must be drudgery. Every branch of knowledge has, in different degrees, two sorts of advantage; first, in increasing one's outward resources; second, as a means of mental discipline and inward culture. For instance, it is said mathematics discipline one set of powers, metaphysics another, or they may exercise the same powers in different ways. And I will here say, that it requires the best disciplined minds to sift such questions as the relations and laws of price, of capital and labor, wages and profits, interest and rent, and many other questions that are engaging public attention. It may be believed that a certain man or woman has natural ability, but there is a rough justice of the world that recognizes nothing short of performance. All excellent work will be paid for in money or fame. Good work, if the world fancies or needs it, will be paid for in money, but not fame. And it is needless to say that a man's neighbors are the last to appreciate his acquirements or ability. Like children, they admire what is distant. A man may remember when a boy, he may have visited a town farther from home than any other boy in his section. No other boy has been so far from home. He immediately arose in their estimation, and was authority for all the games. But another boy went to a city a few miles farther away, and then his reign began, and he tyrannized over him with a rod of iron, and if the former boy made any suggestions, the boys would say, "What do you know about it? Why, here's Jim, he's been to Scranton."

In regard to earlier mental training, opinions differ. Some assert, that "it seems to be an error of serious gravity to suppose that the study of ancient languages at an early period of life is a means of valuable and wholesome mental discipline. They assert that they would introduce first the sciences of classification, embraced under the general name of natural history, as botany, zoölogy, and mineralogy. That no subjects are better suited than these to gratify the eager curiosity of the growing mind, and to keep alive the activity of the perceptive powers." Lately, Noah Potter, the president of Yale college, has resigned that office, probably because his colleagues consider him too conservative. He has ever insisted on the dead languages being part of the curriculum of the college, whilst the majority of the faculty have contended that they should be elective studies.

Slowly one point after another has been gained by the progressive party.

The last and longest step of all was the decrease in the number of ancient languages necessary for admission, and the substitution of an equivalent knowledge of modern tongues. But I am not only thinking of the youth, but also of adults, men and women, who do not think their education was finished when they left school; who are not content to remain stationery in this inquiring age. When it is asked, Is the sun a hollow bubble or a solid ball? Are the planets inhabited? In their school-days they were taught that there were four elements—air, fire, earth, water. Now we are told there are sixty-three, and neither of those in them. And they even talk of telegraphing without wire. In Afghanistan a chief held up a large brass plate in the sun on a high mountain, and flashed a message fifty miles. And it is discovered that a thimble can contain enough power to work the Atlantic cable. It is also predicted that electricity will be harnessed to the earth to sustain humanity. A thunder clap will revive a drooping flower without the rain; electricity will cause flowers to bloom, and stimulate the grain fields. Then, surely, there will be ample time for intellectual culture among farmers' families. No one feels more sensibly than I the force of the arguments that can be urged against want of time, for I well know the multitudinous details on the farm and in the house that take up so much of the farmer's family's time. Yet, if they cannot take the eagle's flight, they may be able, like pheasants, to take a short flight above the level of the stubble. And in their praiseworthy efforts after knowledge, nothing is so favorable to it as the definite fixing of limits. And as has been wisely said, if persons propose to learn the flora of the valley they live in, it is probable their labor would be more perfect than if they set themselves the boundless task of the flora of the world. And so of geology, &c. And every one who desires a perfect economy of time should make a list of the different pursuits to which he wishes to devote himself, and ascertain how much time he can devote to each, not forgetting that nothing flies so quickly as half-digested knowledge. It is better to lay down a few distinct objects or branches of study. It is said that men and women who have given deep attention to one or more liberal studies can learn to the end of their lives, and are able to retain and apply small quantities of other kinds of knowledge, while those who have never learnt much of any one thing seldom acquire new knowledge after they attain to two years of maturity, and often lose the greater part of that which they possessed. Some persons take to culture as a bud which is ready to open into a flower, and just needs sunshine, moisture, &c., while others have to be driven, even under quite favorable conditions. No one should cease to press forward even when conscious of many difficulties. One may not understand fully when scientists speak of the cosmos, the world, and some power controlling it, &c.; but the micro-cosmos, one's own personal self, and the little world he comprises, he is certain of. Then strive after intellectual culture, by reading and study in nature, art, science, travel, biography, sceular and sacred literature. Learn the political history of the United States, and general affairs of the government, and details of civil administration, education, manners, &c. It puts into lives bright thoughts, noble aims; increases their influence for good. Whatever subject they are studying, they should get to the heart of it, the inner texture, the essential elements that make the theme what it is. Seek for that which is vital and potential in literature. True culture does not make a man or women mechanical, insipid; but vital, sweet, profound. To cultivate the mind is not to cram it with information. One should become wiser for what they know. The mind should be able to judge and investigate for itself all that is put before it for its decision. History should not merely mean certain reigns, battles, and important events, but the student should get down to the philosophy of history, and deal closely with cause and effect. The rebellion is not of so much consequence as the causes, the effects.

And now my theme, "intellectual culture," is not, I well know, new; yet, I hope I have been able to present it in a new way, as one would merely take a painting from an obscure dark corner, brush away the cobwebs and dust, and bring it into a new light. I think of one of

Lord Bacon's sayings that "truth more easily comes out of error than out of confusion."

And now, in conclusion, I would say, as we are here assembled to-day in Lackawanna county, our minds cannot fail to be impressed with feelings of mingled awe, gratitude, and adoration to the Supreme Giver of all good, who has placed such vast quantities of fuel in the valleys and mountains of a northern clime for the benefit of his people when the forests are denuded and there be need. And as we think of the heroic enterprise of the pioneers of the Wyoming valley—"Classic Wyoming!"—let all who enjoy the fruits of their industry emulate their virtue and heroism.

HOW TO BRING UP A WORN-OUT FARM.

By A. P. YOUNG, *Millville, Pa.*

[Read at Bloomsburg meeting.]

Among the means of restoring exhausted land, good farming stands pre-eminent, and we will consider this to include, not only plowing and harrowing, but all the various operations of getting the particular soil in hand in the best possible condition to produce a crop. Plowing is the first step. If the soil has been carelessly plowed, many spots have never been turned up, or perhaps the plowing has been confined to a very thin layer of the top. In that case, it must be gradually worked up to a proper depth. A deep soil being a partial protection against both washing and drought, taking up and holding much more water, and storing it against a time of need, thus preventing much carrying away of soluble soil by excessive rains, and creating a reservoir of moisture for the crops to draw from when the dry time comes.

Our exhausted farm has most likely been always plowed one way—the furrow turned toward the fence; if so, there is an accumulation of soil along the fences that must be turned the other way, so as to get it where it can be used to better advantage.

In deepening a soil, fall plowing is permissible that it may get the benefit of the alternate freezing and thawing of the winter to break up and prepare the sub-soil that has been thrown up. Nature will thus make a better preparation than man can. No matter what crop we are preparing for, give the freshly-turned soil a seasoning time to settle before putting in seed. Better be a little late getting in any crop than plant or sow upon freshly-plowed ground. Wet, or spring, if places must be drained, it will be useless to attempt to improve such spots, either by better farming or measuring until the surplus water is taken away.

Having properly drained all parts that need it, and having set our ideas right in regard to plowing, and after tillage, half the battle is won, and the next step is to manure and stock fast as the resources of the farm will permit. In looking about for fertilizing material, we may find about some old building or neglected lane a pile of valuable material awaiting the gathering up. The barn is likely so situated as to pour a flood of water from the largest side of its roof directly on the manure from the stables and accumulating in the yard, whence, after every considerable rain, a coffee-colored liquid takes its way to the nearest straw, leaving in the yard a residue not much different in comparative value from coffee-grounds after they have been steeped and re-steeped until all the soluble part has been removed. No farm can stand *such* drainage long, nor can one already exhausted be improved much while leakage of this kind exists. Better take the manure directly to the field than allow a state of things like this to exist for a single month. The advisability of thus taking out manure at all times is, however, an open question. Our "worn-out farm" must be stocked, and here much thought and investigation will be well repaid. There *is* a choice in the animals that may be kept, and in this the farmer should be governed by the use to which he wishes to put them. The trotting horse, as such, is not a necessity, but horses that can trot off to market nimbly, as well as draw the plow steadily, are the ones to seek.

In cattle there is wide range for selection. For richness of milk and fine quality of butter, the Jersey undoubtedly has the lead, while the Guernsey, Ayrshire, Devon, Polled, and latterly, the Holstein, have ardent admirers as milk and butter producers. The Short-Horn, with his great beef carcass, must be remanded to better pastures than are found at present on a "worn-out farm." The point to be insisted on is, select the stock best suited to the locality, and be satisfied with nothing short of the best in the class selected, then improve upon this. No farm, especially a worn-out one, can be completely stocked without a flock of sheep. Of these, get a breed in which is combined, in the highest degree, the two excellencies, wool and mutton, or wool and lamb, for the surplus stock should be sold mostly as lamb, and that early enough to get the best price of the season. For hog stock, medium-sized, early maturing of varieties will, generally, prove most remunerative, but even these should be only tolerated as scavengers and workers-up of otherwise waste products. Less *hog* and more *health* for the people.

A considerable source of income to the occupants of a well-ordered farm may be found in a select flock of poultry. Indeed, this, with proper care, may be made the most profitable stock of the farm; largely consuming those waste products that otherwise find their way to the pig-pen, and making of it choice meat and healthful eggs in quantity sufficient to make this the best-paying disposition of the material. To secure the latter at the season when most profitable, especial care is required, for biddy will not cackle her delight over freshly-laid eggs unless the conditions are made very comfortable. She will not roost on the comb of a roof, nor in a tree at the north-west side of a shed, and be in a humor to lay eggs about Christmas time. A comfortable hen-house is demanded on every farm to protect the fowls, save the manure, and secure the resultant advantages.

Having secured as much stock of the various kinds as can be properly managed—no scrubs in any department—the next care should be to feed up to the most profitable point. In high feeding of the animals—including the poultry—and properly caring for the manure, is the least expensive and most certain way of increasing the cropping capacity of the farm. The farm may produce food enough of certain kinds to feed all the stock, and yet it may be profitable to supplement that food with something of a different character, having an eye not only to the food contained therein, but counting also with care the residue to be left as manure. Bran, oil-cake meal, and cotton-seed-meal are worth more than half what they usually cost, saying nothing of the feeding value. Here, then, we have a cheap source of fertility for the worn-out farm, provided we can handle stock so as to get anything near the value out of these articles as feed. Investment in these should be made liberally; and though it may be best to commence with homœopathic doses of linseed oil or cotton-seed meal, every animal on the farm should ultimately receive all it can safely and profitably use; for an animal, like most machines, is profitable only when run to its full capacity. But few farmers know the relative value of feed stuffs, much less of the manure resulting from their use. And yet no one can reach the full measure of success in farming without such knowledge.

So far in this connection, nothing has been said of the part that should be played by renovating crops in the problem of improvement. Of these clover stands pre-eminent. No other crop at present known to our soil and climate can be taken off and leave the ground in better condition for a succeeding one. Hence, the oftener clover can be brought in the more rapid will be the advancement. In sowing grass-seed for hay or pasture, remember that clover is an improver, while timothy, and, perhaps, nearly all other grass crops, are exhaustive.

In one of our agricultural journals lately appeared this paragraph: "Estimating the actual value of clover as a fertilizer, the roots are credited with one hundred and eighty-five pounds of nitrogen, two hundred and forty pounds of lime, forty-five pounds of potash, sixteen pounds of soda, twenty-four pounds of sulphur, and seventy pounds of phosphoric acid. At the price given for fertilizers, the cost of these substances would be fifty dollars. Therefore, if a crop of clover is grown and cut for hay, the roots left in the soil are equivalent to the application of fifty dollars' worth of fertilizer per acre. By this process of manuring, the land becomes very fertile, but it must be borne in mind that the larger portion of this fertilizing material comes from the soil itself, the clover, by mechanical and chemical action, simply converting inert matter into plant-food." Other crops beside clover are sometimes grown to be turned under for fertilizing purposes; but at the present stage of agricultural science, it is doubtful whether any of these will pay except where an area too extended to be properly handled otherwise is suddenly acquired. No land should lay idle. The rotation is at fault that allows any field to be without crop or sod for any considerable length of time. Excessive rains and wind carry away much that is valuable from unprotected fields; hence, fall plowing is not to be commended except the character of the soil is such that the ameliorating action of frost is necessary to assist in getting it in condition for the reception of seed. Land that is too poor to take a good catch of clover may be assisted by some form of artificial fertilizer. These should be cautiously tested, and only those purchased that, in actual use, give right results. Much is said and written in commendation of *complete* fertilizers—meaning those containing all the ingredients taken up by crops. There application is all right where there is *complete* exhaustion; but why apply more lime to a soil that already contains enough for generations of cropping, and so of any other necessary ingredient? Consequently, if a fertilizer, the chief value of which is in the phosphoric acid it contains, will give as good results as a complete fertilizer costing twice as much, why make the extra outlay? Why add to a soil that which the soil, by actual test, proves is not at present needed?

A proper rotation of crops will do much for improvement. Waldo F. Brown, in a recent work, discourses as follows upon this subject: "The fact is well-known to all practical farmers that the continual growing of any particular crop on a field will gradually reduce its productiveness until the point at which it can no longer be profitably cultivated is reached. This period may be longer or shorter. according to the nature of the soil or the character of the crop, but the result will be inevitable. Another fact equally familiar to the farmer is, that a field partially exhausted by one crop will produce some other. Another fact not so easily understood is, that after the second crop has been grown for some years the soil will be found to have regained, to a greater or less extent, the capacity to produce the first.

"The reason is that nature is continually laboring to restore the ravages produced by the hand of reckless man. Locked in the soil, and especially in the sub-soil, are almost inexhaustible sources of fertility which, by the force of chemical decomposition continually going on, are slowly but surely being unlocked and prepared for future use. The rains and dews being needed elements from the air above, and the absorption of the earth is continually gathering them.

"Even while one crop is growing, nature is preparing the soil for another. Thus we see that rotation is a real, though slow, process of fertilization. It is, in fact, the method by which the farmer may avail himself of nature's recuperative powers. If, in addition to this, the rotation is accompanied by the application of barn-yard or commercial manures, and includes, at frequent intervals, a crop of clover, which is especially adapted to draw from the air above and the earth beneath food needed for other plants, we see how rotation can be made one of the most useful means of fertilization which the judicious farmer can control."

A good rotation, perhaps the best for our section, is corn, oats, wheat, clover. Some objection is made to oats as being exhaustive and not sufficiently remunerative. As indicated before in this essay, there is especial objection to land lying without crop. If desirable to leave out the oat crop, sow clover-seed at the last dressing of the corn, or after the next spring crops are in plow, and sow to buckwhaat, this to be turned under when in full bloom, as a preparation for the wheat crop.

A few years ago the writer tested part of a field in this way, giving a light dressing of fertilizer to the buckwheat. The result was a crop of wheat equal to that alongside where a crop of oats was harvested and the ground fairly manured from the yard, the whole field being treated to a similiar dose of fertilizer at the sowing of the wheat.

To conclude, there is nothing so essential on a worn-out farm as brains and good judgment. If these essentials are present, the farm may be rapidly improved by more thorough cultivation, by draining the wet places, by keeping the best breeds of stock, feeding liberally, saving carefully, and applying judiciously the resultant fertilizer, together with intelligent rotation of crops, not forgetting that the process can be accelerated by the addition of good commercial fertilizer.

BEE-KEEPING.

By H. H. BROWN, Esq., *LightStreet*, *Penna.*

[Read at Bloomsburg meeting.]

Bee-keeping is a pleasant and profitable pursuit to those who determine to make it a success, by devoting time and labor in becoming fully acquainted in all the details of its management; and I feel assured that millions of dollars' worth of honey is lost every year, of which the farmers of this country might avail themselves to a great extent, and for their trouble and expense receive from twenty to one hundred per cent. profit on the investment. It needs but little capital to begin with, and they can be kept on a very small space of ground, for many are kept, profitably, on roofs in large cities.

Farmers can keep a few colonies, and, by giving them the proper attention, and, at the proper time, can secure from the blossoms and flowers, which are to be found in abundance in rural districts, secreted with honey ready for the bee's visit to gather for its own and keeper's use.

The farmer will not only be the gainer by the honey gathered, but also by the visits of the bees to the blossoms of his orchards and fields, as it is necessary for some insects so carry the pollen from the male to the female blossom to fertilize them, or otherwise they would be barren, or nearly so. If, at the time of the blooming of our apple or cherry trees, we should have a week of cold, stormy weather, so that the bees or other insects cannot work on the blossoms to assist in the work of fertilizing, we will not have a full crop of fruit. And again, if the bloom of the buckwheat contains much of a secretion of honey, the bees will work daily upon it, and the result will be the blossoms will become fully fertilized, and there will be a large yield of buckwheat. The white and alsike clover have very short blossoms, and they secret large quantities of honey, and the bees work on it from morning till night, and by this becoming fertilized are well filled with seed. It is not so with the red clover, as the blossoms of the first crop are deep and very narrow, so much so that the bee's tongue is too short to reach the honey there secreted. And, as the much-abused humble bees at that season of the year are very scarce, as it is the only bee that has a tongue long enough to reach the honey, there are but few blossoms fertilized, and the heads are barren.

And thus it plainly shows that the bee was created for the purpose of assisting the fertilization of the different plants, and that the honey was secreted to induce the bee to visit the flowers to gather the honey and pollen, and thus we secure, through the bee, the delicious honey.

The location does not so much depend on the successful keeping of bees as the manner in which they are kept. Many farmers keep their bees in such a way that you conclude they are either too indolent or ignorant to make them a success. The kind of farmers who can keep bees—at least colonies enough to furnish honey for their own families, if not to sell, are the ones who have the sense to prepare their ground and plant their crops in the proper season, instead of waiting until the moon gets in the right sign. To be successful, you should have a love for bee-keeping, and you should do the right thing, and at the right time, and that requires knowledge; and you can acquire that by reading some standard work on bees, and by the use of practical observation. Where bees are kept on the principle that it is a business, and that it requires some energy to care for them, they will conclude that for pleasure, health, and profit it will compensate them well for the time and attention given to them. Bee-keeping seems especially adapted to women, as it requires patience and attention rather than strength. There are many women to-day engaged in bee-keeping, and they have not only made it pay, but have gained much useful knowledge, besides enjoying a pleasant out-door exercise by caring for their bees. Many, with limited means, can procure a few colonies of bees, and, with the proper care, can make quite a profit with a small outlay, and also have a supply of pure honey for their table. Mrs. L. Harrison, one of the most noted writers of agriculture, whose health, at one time, was so reduced that her physician said she could not live, but apiculture did for her what her physicians could not do—restored her health, and gave her such vigor that she has been able to work a large apiary for years. Mrs. L. B. Baker, of Lansing, Michigan, who has kept bees successfully for quite a number of years, says she has tried both keeping boarding-house and apiculture, and she gives bee-keeping the preference as more profitable, healthful, independent, and enjoyable.

The fear of that terrible bee sting, which every bee seems to know so well how to use in self-defense, and in protecting its stores, may prevent many from bee-keeping. But by the use of a bellows smoker, and a bee veil, you need have but little fear of being stung.

Wax is one of the products of the bee, and is produced by the bee's consuming about twenty pounds of honey to make one pound of wax. The wax exudes from the under side of the bee's abdomen in thin flakes. And then the bees, with their mandibles, press and work it in the comb to store their honey and rear their brood in. Wax is used by the bee-keeper in foundation for starters in the brood frames and surplus section. It is made by running thin sheets of wax through a machine consisting of two rollers, and it forms the base of the cells and slight side walls, thus enabling the bee-keeper to secure straight combs by its use. A colony of bees consists of the queen, workers, and, at certain times of the year, drones.

The queen's place in the colony is simply to lay eggs, and she is capable of laying from two to three thousand a day, and she can, at her will, lay either worker or drone eggs. The life of a queen is from three to five years, and the life of a worker is only from three to six weeks in the honey-gathering season, and a colony contains from thirty to forty thousand bees. It plainly shows, to meet the great loss of workers, the queen must be a prolific layer. The queen can be hatched from any egg, if not over six days old, that would have produced a worker bee, in twenty-one days by enlarging the cell containing the egg and supplying it with food called royal jelly. The queen, six to eight days after hatching, will leave the hive on a pleasant day on her marriage flight, and, if successfully mated, she will begin to lay about the second day after her return, after which she will not again leave the hive unless to accompany a swarm. The worker bee will hatch in twenty-one days from the egg, and their labor, for the first two weeks, is in the hive, to care for the feeding of the larvæ, sealing of the cells, and receiving honey from the bees as they come in loaded, and deposit it in the cells, and seal them up when the honey is properly ripened, after which time they become honey gatherers. The drone, or male bee, lives on the labor of the worker, and is only of use to fertilize the young queen, and as soon as the honey flow slackens, the workers drive them out of the hive and kill them, as they are only considered as consumers. It has always been a query how the bees could store their honey in the cells and have it remain there without running out. The past season I observed a bee begin storing honey, in a cell next to the observation glass, in one of my hives, and I found, on close examination. that the bee had covered the base of the cell with a thin, tenacious film, and when the bee wished to store its load of honey, it inserted its tongue through and under the coating and injected the honey beneath, and, as the cell filled, the film moved outwards, and thus held the honey in place until the cell was filled and ready to cap over.

In starting to keep bees, it is necessary to adopt a hive with movable frames, and the least fixtures you can have in constructing it the better it will be. And of the kind of bees to have, after having the black, Italian, Holy Land, Cyprian, and Albino bees, I prefer the leather-colored Italian for all purposes. An inexperienced person should not begin with more than one or two colonies, as they will increase in numbers perhaps as fast as his experience and knowledge increase. The best time to purchase is in the month of May, and then to select on account of weight as to quantity of bees the colony contains. For, at that season of the year, it is best to have the colony strong; for, if you have plenty of bees, you may expect early strong swarms and surplus honey. The swarming season is one of much interest, and it is thus the bee-keeper secures his increase of colonies. When the first swarm issues, it is accompanied with the old queen, and the bee-keeper should be in readiness with a hive, and, as soon as they have clustered, they should be hived and put on the stand which they are to occupy. In eight or twelve days after the first swarm issues, you may, by holding your ear to the side of the hive, hear a peculiar peeping; for the first queen that emerges from a cell will go roving through the hive, and attempt to destroy the cells that remain, and, if the bees guard them, the queen will make a noise something like "peep, peep," and the queens in the cells will answer "quit, quit;" and they keep that up until about the time the next queen is ready to swarm from the cell, when the bees will cast a swarm, termed the second swarm, accompanied by the queen that first hatched. If it is the desire to have surplus, instead of increase, then, eight days after the issuing of the first swarm, the hive should be opened and all the cells removed except one, and that will prevent any further swarming. The best time, if the colonies are strong, to put on section-boxes for surplus, is about the time the apple-trees are in bloom; for then, if the bees do not swarm, as it is the case some seasons, you will be sure, if there is a flow of honey, to get some surplus. As soon as one set of boxes are partly capped, you should raise them up and place another case of section beneath the other, and the bees will at once occupy them and begin building comb and storing in them. When the honey season is over, the boxes should be removed, or the bees moving over them will soil it. The great difficulty in bee-keeping has been the wintering of them safely. It is safe to say that the average loss in wintering the bees in the northern States has been from twenty to fifty per cent. Bees, if properly packed in chaff, and have twenty to twenty-five pounds of honey sealed and strong in, bees can be wintered at a loss not exceeding ten per cent. The past two winters I have not lost a colony wintered in boxes or clamps sixteen feet long, two feet wide, and fifteen inches high at the rear, and thirty inches at the front. Remove the caps, and after placing an inch of chaff on the bottom, set the hive on it about two inches apart, and then fill up all the spaces and on the top with chaff, and put on a good roof that will not leak. Have the hives all facing one way, and have a tunnel from each entrance, so the bees may fly out whenever they desire; and so you can remove the entrance-block and remove all dead bees during the winter. I prefer no upward ventilation, but cut a winter small passage through the combs, about two inches below the top-bar, so the bees can get from the outer combs to the cluster. Do not let the entrance become clogged with dead bees, or you will lose them by smothering. In conclusion, "the number of colonies in the United States in 1881 was three million, and the honey produced for that year more than two hundred million, and the cash value was sixty million dollars. And this nectar would all go to waste if it was not for the bee-keeper and his bees. They thus save to the country that which would otherwise be lost. Apiculture is thus adding immensely to the productive capital of the country, and should receive the fostering care of the State."

POULTRY FOR PROFIT AND PLEASURE.

By M. P. Lutz, *Bloomsburg, Pa.*

[Read at Bloomsburg meeting.]

Nobody knows when or by whom fowls were first domesticated. There are at most only two or three allusions to them in the Old Testament, and these are of doubtful import. However, in the time of Aristotle, who wrote three hundred and fifty years before Christ, they were evidently common, for he speaks of them as familiarly as a naturalist of the present day. The wild origin of our domestic fowl is entirely unknown. The race is probably extinct. The domestic turkey is not so far removed from the wild state as the domestic chicken. There is no dispute about his origin, the wild turkey not being yet extinct, and not differing so widely from the tenants of our barnyards as to give room for doubt on that point. In fact, if kept in the neighborhood of large forests, they will often stroll thither, without any desire to return, such is the natural wildnes of their species. The domestic goose has acknowledged the sway of man for ages, perhaps since the days of Noah. Homer mentions them where Penelope, relating her dream, says: "I have twenty geese at home that eat wheat out of water, and I am delighted with them." Their cackling, it will be remembered, saved Rome from the Gauls three hundred and eighty-eight years before Christ. Their wild origin is unknown, the wild geese of the present day being of a different species. The origin of the tame duck is not a well-settled point. Dixon supposes it to have been imported to England from India and China in or about the year 1493.

We can hardly suppose that man has cared for poultry for over two thousand years, and yet not be fully satisfied that they are either a profit or a pleasure. Yet this question is so often asked, and by so many different kinds of people, that to answer it intelligently requires some explanation. As facts are abundant, I need not offer theories. Some people condemn theories *in toto*, and when any one is bold enough to advance a new one, they go for him with a vim, which nearly frightens him out of his wits, and theories alike. What a great mistake to thus condemn theory, for it if one of the best things, when properly used, which the Creator has endowed us with. What is successful practice but theory practically demonstrated? Theory must always precede practice, and all our discoveries, both great and small, are the result of theory successfully carried out, and one is intimately connected and dependent upon the other. What we learn may be taught us by some one who in turn was taught by some one else, but if we trace it back far enough, we will find that some one with brains, having tried the old way so long, thought there ought to be a better way. Straitway theory came into play, and by working out the theories carefully, new methods and plans were developed and then put into general practice. Theory is only distasteful and objectionable, as well as pernicious, when it has no foundation, and where there is neither opportunity or inclination to develop it into facts,; but, as I have said, facts are abundant, and I shall not indulge in many, if any, theories. I believe I am safe in saying that in no other department of the farm has there been such advancement of late years as in the poultry yard, for one reason, that in no other department has there been such neglect and abuse, and another is, that there has been a general awakening among the people to the interest of poultry—commonly called the hen fever—the result of which has been to give her a higher place. It has been quite a common idea for a long time that poultry needed but little or no care, and the idea was fully carried out in practice; unsuitable arrangements and wanton neglect characterized the general farm management of the chickens. It is thought by many that any old shed which will not answer for a pig-pen, cow-stable, or dog-house, is plenty good enough for fowls, and the fowls often show their better sense in choosing the fences and apple trees outside, rather than accept the palatial homes offered. This style of houses is not such as will tend to make the keeping of fowls either pleasant or profitable.

Poultry-keeping is no exception to the general principle in all business, that neglect is very expensive. I speak with assurance on this subject, for, as a boy, on the old farm I saw the results of the faulty management. Later I have reaped the fruit of a better system. Nor was my father's management of the poorest; I doubt if there was a better in the vicinity. He gave the chickens a warm house and always had them well fed, faultless roost poles were in position, and cosy nests were arranged to tempt the egg-laying, but for a good part of the year it was only this and nothing more. Cleaning from under the roosts, except at corn-planting, giving warm drink in winter or any drink at any season, feeding meat or vegetable food in winter, or making the house light with ample sunny windows—all this was never thought of. We got abundant eggs in summer when eggs were almost worthless except to aid in pastry and add a relish to the table, and had the chicken stew, the roast, or the famous chicken-pie whenever desired, and, all ignorant that more was possible, we learned wherewith to be content. I would not say, nay, I am of the contrary opinion, that even with such care chickens are not a desirable addition to every farmer's home, but would say, and emphasize the truth, that there is a better way. Under the old system, poultry on the farm is, in some sense, a convenience and a luxury; but under a better system the convenience is increased, the luxury augmented, and there is also a considerable profit. The poultry and agricultural press of the country are doing much good by calling the attention of the farming community to their especial interests. But farmers are very slow to abandon old usages and methods in keeping a breeding domestic stock. No class of men have better facilities for raising poultry. Ample runs, orchards, meadows, and grain fields to roam in and pick up what is left after the plow and reaper, and to feast on the grubs, insects, and worms that infest the vegetation and fruit trees of the homestead.

Now, if it pays to keep cows, sheep, and swine, most assuredly it will pay to keep good fowls. I know that on a farm a bushel of grain will feed a hen a year, and I know that it don't cost the farmer over fifty or sixty cents at most. I know also that any of our modern improved varieties will, with care, lay at least ten dozen eggs during the year; these, at twenty cents a dozen, gives the farmer a net profit of about one dollar and fifty cents for each hen. Many of the failures and bitter disappointments in poultry-raising, as well as in other branches of human industry, can be directly traced to not starting right. If you do not take the right road, you will never reach the desired point, no matter how hard you may push your way along. The first step to success is to procure some prime fowls, though they may cost more than dunghills and mongrels. There are so many different breeds of fowls that there is certainly an opportunity for all lovers of poultry to suit their fancy. The Asiatics are best fitted for limited runs in cold and wet weather. They are good winter layers, well-behaved, quiet and kind mothers. The Plymouth Rocks would doubtless suit many; they possess a happy medium between the Mongolians and the non-setting breeds; they are good layers, good table fowls, and hardy. The Leghorns, Hamburg, Polish, and Spanish dispute the superiority of the others, and ask for a fair trial of their merits to prove that they are equal to the best. The Houdan shakes her tufted crest in derision of such selection, and reminds you that they have no plebian blood in their veins. I might go on and review every variety, and find excellent qualities to recommend them. The best breeds are those which return to the owner the most money for the labor and food expended. It is not necessary that the poultry-house should be elaborately finished, either inside or out, nor any particular style of architecture. A snug warm place in winter, with glass windows fronting the eastern and southern sides of the building, a box of road dust, in which sulphur and insect powder are mixed, dry leaves, short straw, or chaff strewn on the floor, a box of gravel, slacked lime, old mortar, broken bones, crushed oyster shells, and some charcoal or charred corn constitute the chief articles needed for a winter poultry-house, or where fowls are confined during other seasons. Nothing expensive or hard to procure. A year's subscription to a good poultry-paper or magazine should be added, and yet the bill is not large. The dust box should be placed where the warm rays of the sun will heat it.

Small grain thrown among the leaves or other litter on the floor, give the fowls exercise, and keep them busy during the cold days that they are not allowed their freedom. Exercise is essential to good health; it promotes a healthy action in the whole fowl economy, gives a natural warmth to the body, thereby stimulating the egg functions to generous activity. This is not all, do not crowd too many into one house; keep the place clean. The horse and cow stables are cleaned every day, why should not the hen-house? Wash the roosts frequently with kerosene oil, and whitewash all the wood-work. An absolute necessity is a supply of good fresh water at all seasons of the year; they should have it fresh daily, which can only be insured by making it a point to furnish it regularly as the feed is given. When that plan is once established, it becomes a part of the regular routine and is not neglected. Have some arrangement for watering, so that the young chicks will not be tempted to drown themselves in the water-trough where the horses drink. I presume some of my hearers will shrug their tired shoulders at what I have presented, and with the thoughts of an already irksome life, will mutter "too much work." But it will pay. To expect that hens will lay well in winter, when eggs are most desired on account of high prices, without a correspondingly liberal amount of food and care, would be folly in the extreme. Every year we see a constantly increasing demand for fresh eggs, for they enter more largely into the cooking arrangements of every household than any other thing we can name. I do not ask you to engage in an enterprise that is already crowded, as we never hear of over-production in the poultry business.

The supply is far short of the demand. The imports of eggs for 1884 amounted to sixteen millions two hundred and eight-seven thousand and two hundred and four dozen, valued at two millions six hundred and seventy-seven thousand and three hundred and sixty dollars. Must we continue to use the cheap labor of foreign hennerage, or shall we send a delegation to Washington to secure the passage of an "anti-foreign hen-fruit bill?" While the lobby is getting in its work, let us press every available hen and pullet into service, and persuade them, by good care and feeding, to do their best to increase the domestic egg supply. The egg trade of the country is immense. It is estimated that the inhabitants of the United States consume forty-five millions per day. New York alone consumes forty million dozen annually. The question, "Does poultry-keeping pay?" can be answered much more to your satisfaction when I can point to particular instances where care is repaid by profit. From reliable experimental records, kept by ten farmers one year, I find an average profit of one dollar and ninety-six cents for each hen, the first cost of the hens being fifty cents each. Here is about four hundred per cent. profit. If ten farmers can realize as above, why should not ten thousand do the same thing? The egg supply of this country, as already shown, is over sixteen million dozen short. To make up the deficiency, we need about one million five hundred thousand industrious pullets in addition to the present supply. So I feel safe in saying that there will be a handsome profit for those who devote more time to the care of poultry. Poultry-culture is also an ennobling industrial pursuit. It gives permanent pleasure and recreation from its incipiency to its termination. It refines the grosser part of our nature; it aids us to appreciate their usefulness, and to see with clearer mind and eye those lovely objects plumed in the most varied and transcendent gorgeousness. If we only have our hearts fully in accord with our work, we can find real genuine pleasure in the pursuit of any calling or business, and breeding poultry is certainly no exception. If a person does not find any pleasure in feeding his fowls, and caring for their wants and needs, he had better give them up entirely, for the fowls are sure of being more or less neglected sooner or later, and neglect or carelessness effectually checks profit. Breeding fowls for profit is not incompatible with breeding them for pleasure, too, and things generally go hand in hand. If you go at it to make a profitable business of it, and find no pleasure in your labor other than that brought by dollars and cents realized, you stand a fair chance of failure. As a means of recreation for the hard-worked business man, it affords rest as well as diversion. A change of scene or occupation to the man of care and business is a relief, a soothing balm to his burdened mind. Like unto the tired and thirsty traveler who falters on the arid waste of the Lybian desert, sighs for an oasis wherein he may rest his wearied limbs and cool his parched lips, the man of care finds a pleasing relief, after the wear and tear of every-day life, to muse and look awhile on the varied oejects of nature. We see him now returning from his place of business, and he becomes as if he were a child again, gazing at this bud or flower, or listening to the song of some caged bird. But what a change awaits him at home! There on the green sward stands his flock of feathered favorites waiting his approach.

They see him come, and instinctively know he is wearied and out of sorts by the furtive glance he casts aside. Cheerful creatures, they are nowise selfish. The presiding chanticleer, like a faithful sentinel on the watch tower, gives one of those peculiar screams of warning, they rise on foot and wing and flutter around his feet. The mind of our care-worn man receives a new impulse. The labors of the day are forgotten, and the thousand and one odds and ends of business which weigh on his brain like an incubus, are lulled to rest as if by magic. Cold selfishness gives place to sympathy and kindness, and worthy aspirations bow in humility to the Creator's works before him. What a change! The groveling and speculative man, who, a few hours before, thought of nothing save the manipulation of stocks or a corner in some speculative enterprise—see him now in the midst of his pets talking to this or that bird like a child; see him stroke the glossy plumage of his Leghorn pullet, and hear him interrogate her on the number of eggs she has laid thus far; see him smile when the consequential bantam, with trailing wings and tip-toe steps in front to receive his caress; see him yield to the gentle pressure of the hand, how pleased he seems when he hears his master say, "that Seabright is a clever fellow." One by one they pass before him in review. He examines the comb of this one to see that it describes a perfect arch, or the lobes of another, if they are free from spots and wrinkles; see him now balance the Langshan in his hands, and hear him mutter to himself, "This fellow, if he keeps on, will beat Jumbo yet." The coquettish Houdan hen peers from behind her turbaned veil like a Moorish maiden and bides her time. She is recognized by her ornamental dress, and is dismissed with the words, "Good layers, those Houdans." The sprightly Hamburg, moving like a clipper ship in full sail, receives a well-merited praise for its beauty and productiveness, while specimens of lesser note file along the smooth turf in their best appearance awaiting a kind word from the care-worn man. But the shades of evening are drawing nigh, and as the birds depart to their accustomed roosting place, a serene smile seems to play on the man's face as he enters his mansion with a lighter heart and lighter step for being in company with his fowls, and forgetting for awhile the cares of life.

HOW TO BRING UP A WORN-OUT FARM.

By Hon. WILLIAM GATES, *Member from Venango.*

It has been a serious problem with many farmers to know how to restore land that has been exhausted by a bad system of tillage. The pioneers of this section of the country were poor people, and to make homes in the wilderness was no easy task. Scientific investigation and book farming were not known. Suitable implements to cultivate the soil were not to be had, and a system of double cropping and pasturing continued until nothing more could grow, and then abandoned to briars and weeds until it could recuperate by rest and natural causes. To restore worn-out land, the first step should be to remove all obstructions, take down the old worn rail fences and replace with straight fences, made of post and rails, or boards, or wire. By so doing, sixty perches of land will be added to tillage on a ten-acre field, and saved to clear out the old fence corners of noxious weeds and useless brush and briars. The next step: All wet land should be underdrained; this can be done cheaply thus—Dig a ditch two and a half to three feet deep and eighteen inches wide from the spring, or source of supply, and place a stone about one foot high against one side, and another stone eighteen inches on the other side to lean over against the first stone, to serve as a brace to hold the first stone in position; this will leave a cavity to convey the spring water, then fill in small stones to level up, and you will have a drain that will not only convey the water from the spring, but also the surface water. By using the stone in this way, you make two points at the same time: First, by removing an incumbrance from your land, and, second, by placing them out of the way and making a good and efficient drain. But if you do not have stone on your premises, buy tile, or use any other material that will bridge a cavity to conduct the water from the land you intend to cultivate. It will not pay to cultivate land that is constantly saturated with spring water. After drainage has been made, plow neatly the depth of the soil, (and, if available at reasonable cost, apply one hundred bushels of slacked lime per acre, to neutralize the acid in the ground, and prepare the soil to feed a growing crop;) plant to corn or sow to oats or barley; if to oats or barley, sow mammoth clover. Let clover stand till ripe; cut the top for seed, with reaper; plow under the clover stubble, pulverize thoroughly, top dress with manure, and sow to wheat or rye; follow with corn, plow late, pulverize thoroughly, check-row three and a half feet each way, drop three grains in a hill, cover with a hoe, (if early, four inches deep, if late, two inches deep,) work the corn early and thoroughly, follow with oats or barley, plowing two inches deep in the fall to deepen the soil and bring to the surface a clay sub-soil that will prevent too rank growth of oats or barley. The clover seed that was plowed under with the stubble will probably seed the ground sufficiently; if so, let it stand until next season, and cut the seed as before, and top dress with manure or commercial fertilizer, and sow to wheat or rye. By following this course of rotation of crops, you can secure a crop every year, and your land increases in fertility, provided, always, that you do not let any stock run over it and tramp the life out of the soil. It is useless to spend time and seed in cultivating land in a careless manner and expect remunerative crops. Thorough cultivation is required on the best of lands, to insure large results. No hay, straw, or feed grain should be sold from the farm, but should be fed to the stock that will pay to keep and feed, and the products of the farm converted into live stock, dairy products, poultry, wheat, and meat. Horace Greely, in his lifetime, told a great deal of what he knew about farming, and, among other things, said that the best farmer was the one that made the most manure. A great loss is sustained by many farmers by letting their manure lie in the barnyard for months, and sometimes for years, and when it is carted to the field there is nothing left but the fiber. Manures should be carefully collected and kept under cover; care should be taken to keep it from burning while decomposing; water should be applied with a hose or otherwise, to wet it, but not enough to leach it. By close attention to it in this way, the liquid will be absorbed and the ammonia retained. The man who sells hay, straw, and coarse grain off his farm may accumulate money while times are easy, and while his farm has so much of the richness of the virgin soil left that it can endure a few years of absolute starvation without immediately giving evidence of the extraordinary strain that is being put upon its resources, but sooner or later the day of reckoning must come to the farm that is systematically starved in this way. Clovers of all varieties are the best green crops to plow under for fertilizing the land, but too many farmers deceive themselves and cheat their farms by sowing clover to fertilize their land, and when haying time comes, cut the clover, make it into hay, and sell it off the farm; and still worse, turn in their stock to eat the blade and tramp the ground as hard as a board, and wonder why their land won't produce good crops. It seems to be the prevailing opinion that timothy is an impoverisher of land, but your writer is not of that opinion; it is a tender plant, more easily killed than wheat by late frost. We seeded four acres with timothy and mammoth clover, as they mature at the same time, excepting that in two or three years the clover would be killed out and disappear, but close observation taught me a lesson. In a warm-growing season and no late frost, the grass was nearly all timothy, and when the season was dry and late frosts the grass was nearly all clover. This lot was not pastured by any stock except sheep in early winter. After cutting a good crop of grass for eleven years, I plowed down the sod, top-dressed with manure, sowed to wheat, had a good crop, followed with corn; sowed clover the last time the corn was cultivated; catch was good; the next season the clover and other green stuff was so heavy that it was difficult to plow under; sowed to wheat, had heavy crop, followed with corn, etc., etc. You must feed your land if you want it to feed you, and the cheapest way to do this is with manure and green crops. It will not do to depend on ground lime, or even slacked lime, for neither possesses plant food. Nor will it do to depend on commercial fertilizers. It is true they will stimulate and help the plant to start and increase the crop, but they cost too much, and can be supplied with other material more lasting on the farm. Recapitulation: Take off all obstructions, underdrain all wet land, apply lime to neutralize acidity in the land, plow well, top dress with manure or commercial fertilizer; sow wheat, rye, oats, or barley, and seed to clover to plow under when ripe; follow wheat and rye with corn; follow corn with oats or barley; after oats and barley, wheat. By following the above rotation, you can get a crop every year, provided that you do not pasture any stock on the land, you cultivate in field crops, and your land will increase in fertility.

BEST WHEATS FOR MILLING.

By A. L. SCHOCH, *of Bloomsburg, Pa.*

[Read at the Bloomsburg meeting.]

Wheat has been cultivated from the earliest ages. It is the most valuable and highest esteemed of all the cereals, and is second only to corn in productiveness. The increase of its cultivation, and consequent use as a staple article of food, has marked the progress of agriculture and wealth, and, in no small degree, the civilization of many countries. With this growth of prosperity and refinement, has come an increased demand for the best quality of food, and hence the constant inquiry for the highest possible grades of flour. As the miller's success in producing this most important article is as universally praised as his failures are condemned, it is due him that his wants be supplied by growing the varieties of wheat best adapted to his use. Indeed, so exacting have most consumers become as to the quality of their flour, that modern milling is said to be no longer a trade, but rather an art. This requires the miller to have a knowledge of the constituent elements of both wheat and flour, that he may be able to select the best materials for his purpose.

Winter wheat (and that alone interests us in this community) has ever been in demand for milling. Beautiful in form, rich and sweet, less susceptible to injury from indifferent milling than its high-prized competitor of the North-West, it has well been called the ideal wheat of the world. That wheat for milling should be plump, sound, and clean, is admitted; but, as almost every variety may be made to fulfill these conditions, together with the fact that the actual amount of nutritious matter contained in the different kinds does not vary sufficiently to be of serious importance, shows that there must be some other requisite. This essential element is the gluten of wheat. It is that property which gives a sticky consistency to the dough, preventing the escape of the gases formed during fermentation, thereby puffing up the mass, and giving it the cellular, spongy testure, which characterizes fine bread. It also renders flour capable of absorbing a larger proportion of water, thus increasing the quantity of bread produced, and correspondingly enhancing the value of the flour. The quality of this element is equally as important as the percentage contained. It should be elastic and insoluble. There are, also, other conditions affecting the quality of wheat, but of so little importance as compared with the quality and quantity of the gluten found that this practically becomes the criterion of its milling value. This shows the importance of careful analysis and investigation, and it is to be regretted that so little effort has yet been made in that direction with any practical aim in view.

It would be useless to attempt to name all the desirable milling-wheats adapted to this or similar winter-wheat sections, and we, therefore, will indicate only a few of the leading ones. The long berries hold the prominent place of distinction among millers.

The most important and well known of these varieties are Mediterranean, Lancaster, and Shoemaker, all of which are rich in gluten and particular valuable for roller-milling because of their hardness. They are also well adapted to our soil and climate.

Boughten, Canada White, and White Blue Stem are, perhaps, equally good. They have the strength of the long berries, and yield a fair quantity of excellent white flour. The great popularity of the long-berry reds has created the erroneous impression here that all white wheats are inferior. This is, doubtless, accounted for by the fact that the only white wheats now grown are Clawson and Eureka. Both these being weak and deficient in gluten, are seriously discredited by millers. Fultz wheat is produced in greater quantity than any other kind in this State. It is a favorite among farmers because it yields somewhat better than the long berries. The quality, although not really bad, cannot be classed above middling. It produces a soft flour that will not please those accustomed to the better varieties, and is, therefore, not sought after by millers.

All soft wheats are objectionable. The harder the berry, the more firm the contents of the grain, provided the bran is tough not brittle, the better. Weight is also an important factor. In general, as the increase relative weight, so the increased percentage of gluten, provided it is equally dry, as the cause of large specific weight may be due to an excess of water, which deteriorates its value in proportion as it is greater than normal. Care should be exercised in introducing new, though they may be good varieties grown in different soil and under different climatic conditions. These conditions frequently make the characteristics of a variety quite pronounced as compared with those of the same variety grown in different sections of the country. As, for instance, the Lancaster wheat of the North is quite different from the wheat bearing the same name in Virginia and Maryland. The Fultz wheat of Kansas is far superior to that of our own State. Equal care should be taken to keep up the grades of the good kinds, as the milling qualities frequently degenerate the longer they are cultivated in the same place. This degeneration can be greatly arrested by selecting the very best seed and changing that grown on one to another and different soil. When changes must be made, and they are sometimes necessary, inferior kinds should be avoided. No permanent advantage is gained by growing poor, because prolific, varieties. The temporary profits are generally overbalanced by the final loss sustained in marketing an undesirable article. We had a conspicuous example of this fact in Michigan some years ago, when Clawson wheat was introduced there. Its beautiful appearance and large yield brought it quickly into great popularity. Very soon comparatively little else was grown. Millers bought it freely, and, before they fully discovered its inferiority, had widely distributed the flour made from it, the low grade of which, in many cases, blasted the reputation of well-established brands, that had required years of care and expense to establish. For a time, the milling industry of that section was seriously crippled, and was only restored when good wheats were secured. Then millers generally refused to use it, and farmers were obliged to sell it at very unsatisfactory prices.

The more closely this matter is investigated the more evident it becomes that the interests of the farmer and miller are identical; the former securing a ready and profitable market for his wheat when he supplies the kinds the latter is obliged to have. To the farmers of this community this fact is particularly applicable. We have an excellent market in the surrounding coal country for good wheat, but for good wheat only, as that alone will produce the high grade flours consumed there. Our average mixed wheat will not answer their purpose, and can only be used in small quantities, when mixed with better grades, obtained chiefly in the West. These better wheats cost the millers considerably more than what is obtained for our mixed lots, and this difference in price, which, in the aggregate, is very large, is lost to our farmers. If only good milling varieties were cultivated, a local reputation would soon be established, and equally satisfactory prices be obtained; the average quality of the same desirable kinds produced here being equal to those grown in our neighboring Western States. The great popularity which their wheats have justly gained is due rather to the quantity of fine milling wheats produced there than any superiority over the limited quantity grown here. They not only grow the best varieties more largely, but usually vie with each other to produce the best of the kind.

The numerous large flouring mills scattered throughout those States are monuments to the wisdom of this course. The flours made by many of their mills have obtained world-wide celebrity for their excellence. Their success has enriched their owners, and, to a certain extent, the surrounding community from which their supplies of wheat were drawn, notwithstanding the disadvantages in freight under which they labor in delivering their product to the Eastern consumer. We have many equally good flouring mills here, equipped with the improved modern machinery and appliances, but their product is not equal to that of their Western competitors, when using our average quality of wheat.

If our farmers would supply them with the grades of wheat they require, they could make equally fine flour, enabling them to compete successfully in any market, and command the same remunerative prices. This success of our millers would not fail to contribute materially to the prosperity of our farmers, in securing them the highest price for their product.

LIFE AND HABITS OF INSECTS.

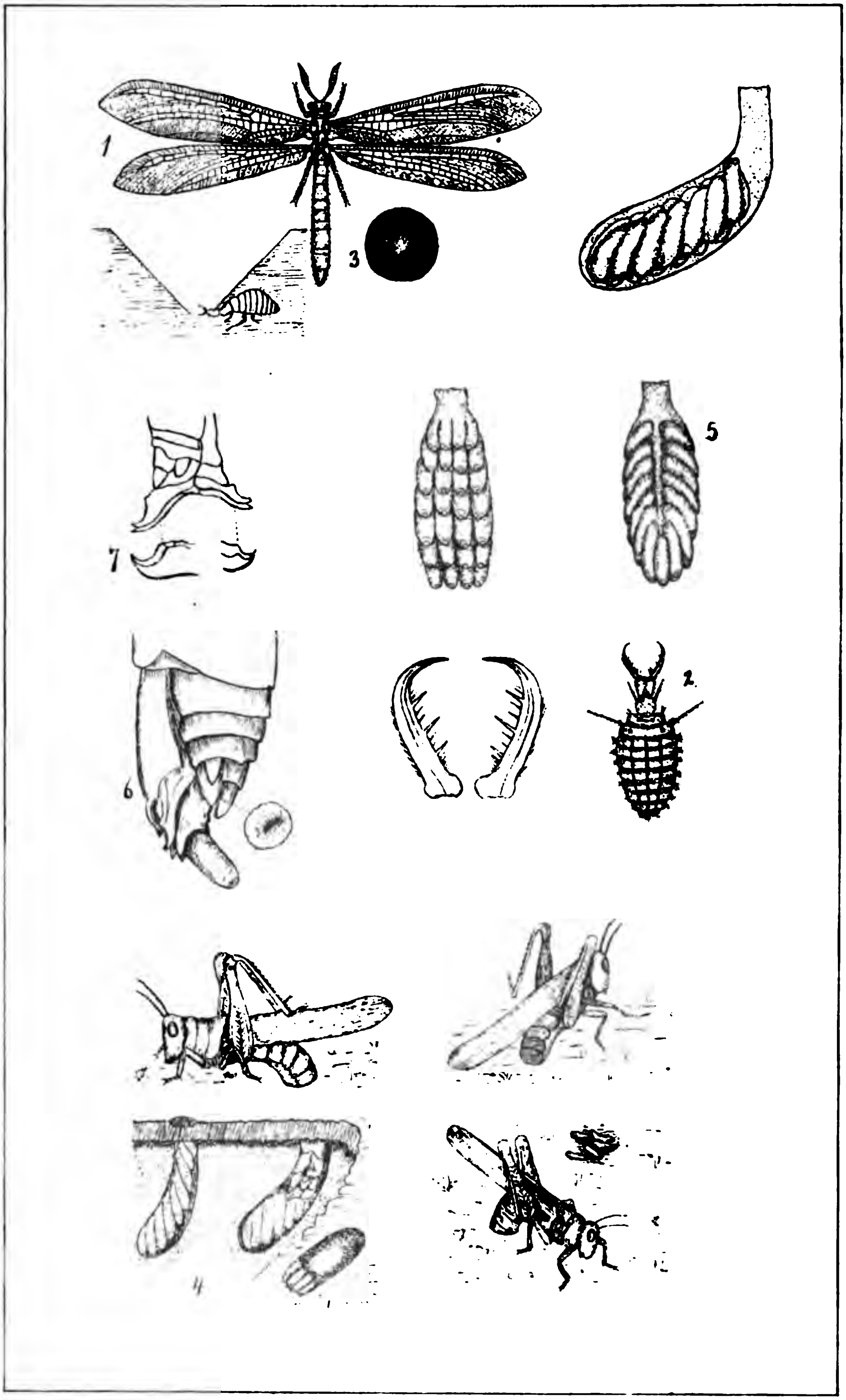
Abstract of a lecture delivered by Prof. W. A. BUCKHOUT, *Entomologist of the Board, at Bloomsburg, Pa.*

It has seemed to me that at a meeting of this kind the consideration of the general life history of insects will be of more value than the consideration of special cases, for there is much popular misapprehension as regards insects, what they are, how they live, how they may be destroyed, &c. Moreover, upon the facts, as derived from a study of the life history of insects, are based the special means employed in individual cases whereby noxious kinds are destroyed and useful ones protected. Insects are found very widely scattered over the earth wherever the climatic conditions are favorable to their development and sustenance. It is scarcely necessary to do more than mention the fact that they are frequently present in enormous numbers. It is not so well known that there are also enormous numbers of kinds and species. A single family, like the beetles, contains not hundreds but thousands of species, which have been, to some extent at least, studied and collected. Although so numerous in both species and individuals, there are certain characters in which they are alike, substantially, though varying greatly in minor details. Insects are relatively small animals, and have bodies which, in the adult state, are divided into three well-marked regions, head, thorax, and abdomen; they have also jointed legs and one or two pairs of wings, except in occasional instances. Of more value than anything else, however, is the metamorphosis, which is more or less conspicuous in all this class of animals.

All insects, with very few and insignificant exceptions, are reproduced from eggs. The eggs of insects are necessarily small, but they vary very much in number, shape, size, and markings. When many are placed together they are generally compressed, and covered by a glutinous substance which protects them from moisture. The eggs are not laid promiscuously, but are placed with considerable care, and for this purpose the female insect has generally peculiar or special appendages at the posterior end of the body of such shape and general structure that as the eggs issue from the oviduct they slide easily into the designed place. The ovipositing apparatus varies from a simple one used only for guiding and placing eggs in regular rows to a very complicated one where hard material, even the hardest of wood, is perforated, in order that in it, or perhaps beyond it, the eggs may be placed. In common with the instinctive and inherited methods of egg-laying, all insects make abundant provision for their young, either by providing food for them beforehand or by placing the eggs in such positions that the young can easily reach the food fitted for them. Pausing to note whatever of practical value can be derived from the general life history of insects, the question is at once suggested, to what extent, if any, can injurious species of insects be held in check by destroying their eggs? Where eggs are rendered somewhat conspicuous, either by reason of their size or the manner in which they are grouped together, it may be practicable to collect and destroy them. A number of the moths, whose caterpillars live on the leaves of fruit trees, lay their eggs closely together, covering them with a thin coat of varnish to protect them from the weather. From small trees such egg-masses can be collected, particularly after the leaves have fallen, and it is unnecessary to say that small trees are the ones which feel the ravages of such insects most severely. The little white tree cricket lays its eggs in the stems of various trees and shrubs, particularly such as have a large pith. The affected branches are seen quite easily and can be cut off and burned. Were all fruit-growers to do this, the injury produced by this insect would be reduced to a minimum.

The hatching of the egg gives rise to a young form which is technically known as the larva. In most cases, the animal is worm-like, and the common name "worm state" is often applied to larvæ. However unlike their parent these larvæ may be, they are their natural progeny, and the worm-like appearance is merely superficial, since this state is but a transitory one, giving rise to the adult form in due course of time, and hence, bearing to it the same relation which infancy bears to manhood. These larvæ have a remarkably good development of some organs, while others are but poorly represented, if at all. The respiratory system is well developed. Along the side of the body are small mouths which communicate with tubes running inward, then lead to larger tubes running lengthwise of the body, which divide up into smaller and smaller twigs, which are hollow and so extensive that they make a fine net-work running through the whole body. In order that a liberal supply of air may be conveyed, these tubes are everywhere held open by a delicate, spirally wound filament of horny matter. Their breathing is not done through a single mouth at the end of the head, but through these lateral mouths, and into their communicating fine tubes. Equally well developed is the digestive system of the larvæ. It is capacious and well fitted for disposing of large quantities of food at frequent intervals. To say that larvæ are possessed of enormous appetites and are gross feeders is but poorly stating the case. Some larvæ are fitted for living upon soft, juicy material, only, their mouth parts being very simple, and unable to make use of food of any other description; others readily eat and masticate ordinary cellular tissue as found in leaves and fruits, but are unable to use hard, woody tissue of stems and roots. Still others find wholesome food in the hardest parts of tree trunks, through which they cut with ease, and upon the nutritious parts of which they live. Details of structure differ so much in larvæ that they call for individual description, and can be considered best by taking up individual cases. Since a large share of the injuries done by insects are done by them while they are in the larva state, it is then that some means of destruction are called for. When it is at all practicable, nothing can be more effectual than picking and destroying by hand. It may excite a smile to speak of trying to exterminate insects by hand, but there are frequent cases where it is not only the best, but the only practicable, course. The oft-repeated case of the apple-tree borer is precisely in point. Here we have often but a single larva in a tree, definitely located at or near the base of the trunk, in a burrow whose position is marked by the discolored dust which the worm is constantly pushing forth. Since the burrow runs for the most part upward, and, moreover, is more or less clogged by the wood fibers and saw-dust which the gnawing worm has displaced, it is useless to attempt to disturb him by throwing any corrosive substance into the burrow. It cannot reach him. You must cut open the burrow, thrust into the enlarged opening an iron wire bent into a hook at the end, and draw the worm out, to be crushed under foot. No better means have ever been de-

PLATE I.



vised, and, so long as no preventive measures are taken, this must stand as the most effectual means of ridding our trees of this formidable enemy.

The use of such substances as Paris green, whale oil soap, lye, &c., is founded on their well known corrosive effect, and as larvæ are generally very tender skinned, a comparatively small quantity or weak solution of such substances may be quickly fatal. In practice, the difficulty of applying or projecting these materials so that they shall accomplish the desired result, is the most serious one, since so many larvæ are shielded by living on the under sides of leaves and beneath projecting scales, that it is not always easy to reach them. The application must be determined by the circumstances in each case. Of late there has come into use a substance long known and employed in eastern countries—pyrethrum powder. It is obtained by grinding the flower heads of pyrethrum—a plant not unlike our common ox-eye daisy. When this dust is drawn into the breathing tubes, it proves a very great irritant; and most insects are seriously affected by even a small quantity of it. Fortunately, it has no injurious effect upon other forms of life, and hence can be used without fear of injury to anything except the insects. The drawbacks to its more frequent use are its cost, its liability to deteriorate with age, and to being adulterated by dealers. So many insect larvæ are found living in the ground, and sometimes so many are found hibernating there, that it has been a common recommendation, where cut-worms have become bad, for instance, to plow late in the fall, so that the worms would be upturned, and being thus exposed, would be destroyed by the frost of winter. The idea appears reasonable, but, unfortunately, such experiments as have been made do not seem to verify it. In other words, insect larvæ are able to withstand a degree of cold much greater than is ordinarily supposed.

Resuming the matter of general life history, we find that, should the larvæ live out their allotted time, which varies greatly in different species, they pass gradually into a second or pupa state. In some cases, this is acquired without any marked change in habit or actions, but in the majority of cases, there is formed about the body a special case or covering, either of something picked up and built about the body, or of something which is secreted by the larva itself, and, exuding from the body, forms a silken cocoon which enwraps it. The protection of the body seems to be the use of these coverings. Within them the larvæ gradually becomes changed; the body shortens, the true legs, wings, antennæ, and other parts appear. At the same time, the internal organs become correspondingly modified, and the whole character of the insect becomes changed, whereby it is no longer fitted for the life, habit, &c., of a worm, but for those of an adult insect. Through all these changes, the cocoon serves as a most efficient protection from the weather and from the attacks of enemies. However, cocoons sometimes betray the presence of a pupa, when it would otherwise escape notice; and there are some instances where a ready means of destroying injurious insects is found in collecting the cocoons and burning them. It is, however true, that many of our largest and most conspicuous cocoons are of harmless species, or of those which have never been known to be present in so great numbers as to be specially injurious. Should pupæ not meet with any serious obstacle in their growth, they will, in time, become full grown adults, which are technically known as imagos, thus completing the triple existence which insect economy illustrates. Adults show the highest development of bodily structure, and upon them devolves the process of reproduction of their kind. Indeed, this seems to be the chief function possessed by them; and in many cases, the whole time and energy of imago life are spent in making provision for the production of the species—no food being taken at all, or only that of the simplest kind; so soon as pairing and egg-laying have ceased, they die. For the most part, it is the shortest period of insect life. It is no uncommon thing to find the first or larvæ life running over several years, the pupa as many months, while the imago lasts only as many days.

Thus have been sketched in a familiar way the life history of our common insects, simple enough to one whose study and attention have been frequently rewarded by seeing with his own eyes these different forms, but ever a source of wonder, not unmixed with incredulity, from those whose observation has been slight, and whose attention has been engrossed by other things.

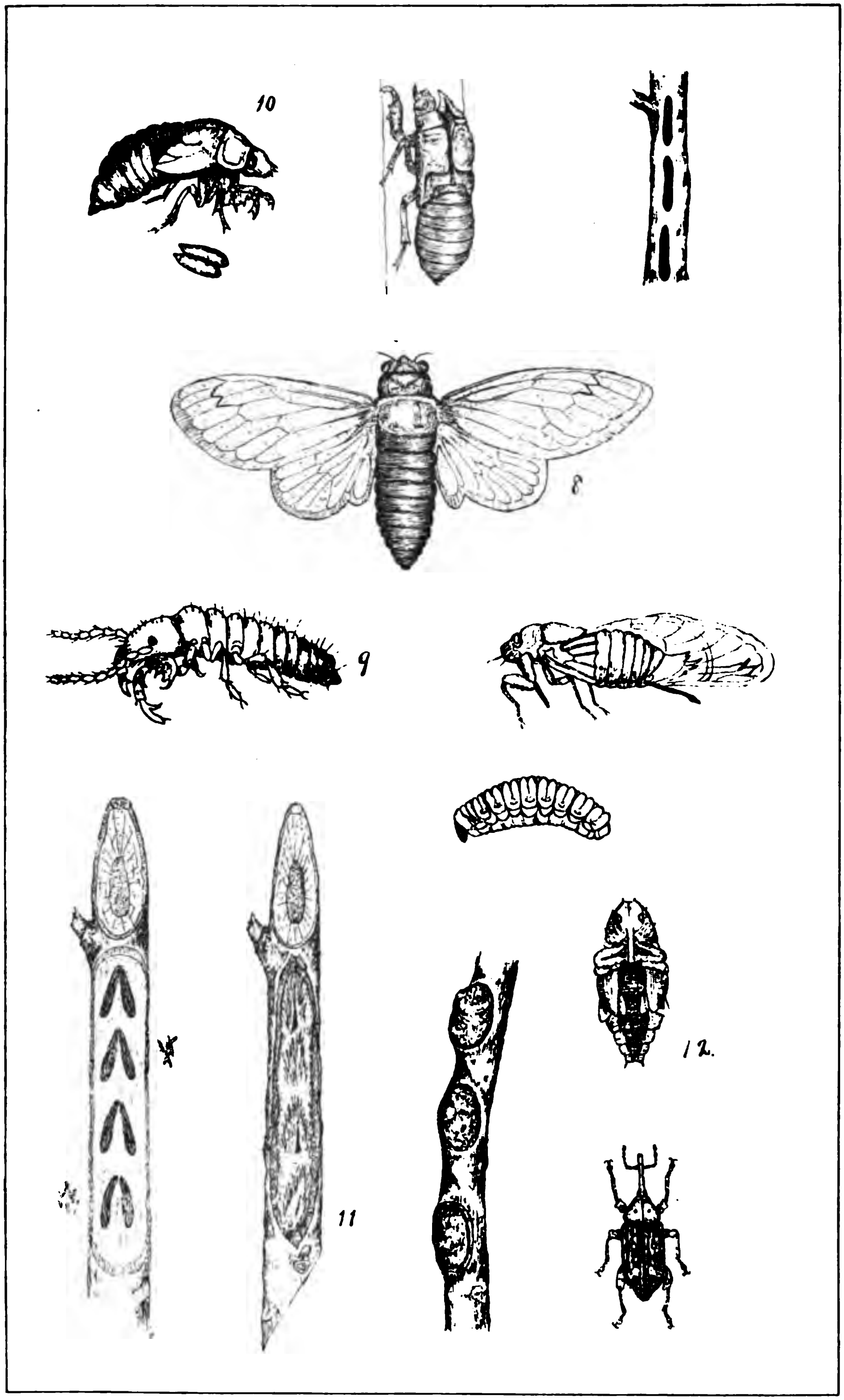
Realizing the difficulties in the way of a good understanding of this method of metamorphosis, which is the key-note of all insect life history, I shall ask your indulgence while I try to illustrate it again and in a somewhat different way, namely, by taking examples from the principal families of insects and explaining them somewhat in detail. The simplest classification of insects groups them into seven great families, each of which is named after some character of the wings. They are *Neuroptera*, (nerve-winged insects,) *Orthoptera*, (straight-winged,) *Hemiptera*, (half-winged,) *Coleoptera*, (shield-winged,) *Diptera*, (two-winged,) *Hymenoptera*, (joined-winged.)

The *Neuroptera* are probably the simplest of insects. Fig. 1, Plate I, represents a good typical example of this family, the "ant-lion." It is not a conspicuous or common insect in the adult state, nor is it an injurious one.

The larva, Fig. 2, may be found during summer and early fall. It constructs a funnel-shaped pitfall, a plan of which is shown in Fig. 3, in sand or loose earth, and conceals itself in the bottom, leaving only its long, curved jaws exposed. Any unwary ant or other small insect which falls into this trap is quickly seized as soon as it reaches the bottom; or if it struggles, and seems likely to escape, the ant-lion dextrously flirts sand at it, and thus brings it down within reach. The jaws, shown enlarged in the adjoining figure, are heavy, curved at the tips, and hollow throughout. With them, it not only holds its victim securely, but readily pierces its body, and sucks therefrom every vestige of juice. Having no further use for the lifeless, shrunken body, it is tossed up and out of the trap, which is then carefully repaired and put in condition for catching another victim. When the larva has completed its term of life, it covers its body with a thick, tough coat of silk, of a globular form, and therein awaits the change to the adult state. When it issues from this cocoon, fully formed, it is an elegant, slender-bodied insect, very much like the dragon-flies, so common about our pools of water. Its wings are beautifully reticulated with veins, which form a strong framework, and to which the term nerve-winged is applied.

Many of the insects of this family are aquatic in their larval life, and comparatively few of them are injurious.

In the family *Orthoptera*, the grasshoppers and locusts are typical. Few insects have done more injury to the farmers of the West than the Rocky Mountain locust; and in the East, the little red-legged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locust often does considerable injury during times of drought. The prominent points in the life and structure of these insects are shown in Figs. 4, 5, 6, and 7, Plate I, copied from Professor Riley's paper on this subject. In Fig. 4, the eggs and the method by which they are deposited in the ground are shown. The female selects ground which is moderately firm, and there produces a bag-shaped burrow, in which the eggs are laid with great regularity. This burrow is made by repeated movements of the jointed abdomen, as illustrated by the insects in different positions. The peculiar forceps-like termination of the body (Fig. 7) aids very much, and the regular placing of the eggs, so well marked in Fig. 5, three views of the egg mass, is accomplished by the ovipositing apparatus, Fig. 6.

If the eggs were thrown in loosely and irregularly, they would be more easily destroyed, and the young would find difficulty in extricating themselves when hatched. The larva, pupa, and adult states of locusts and grasshoppers are not sharply distinguished from one another. The young have the general form of the adult, but are without wings.

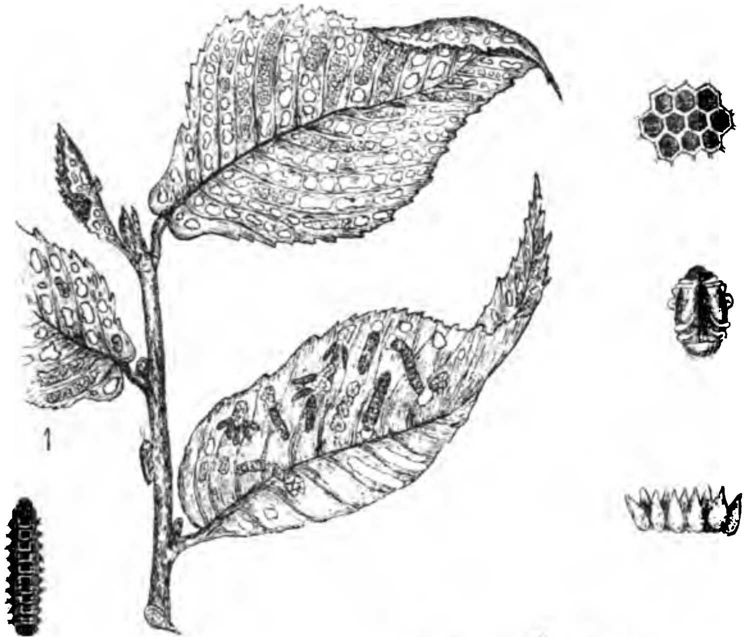
A curious and interesting insect of the family *Hemiptera* is the harvest fly, or, as generally called, the seventeen-year locust. It is not at all related to the locusts of the preceding family, as may be readily perceived by comparing them. When the seventeen-year locust is abundant, it is a very conspicuous insect. It may be found in great numbers in forest trees or issuing from the ground. The males keep up an almost continuous noise, made by a peculiar apparatus situated at the base of the wings. When the females are ready to lay their eggs, they may be seen standing upon the smaller limbs and industriously digging up, or rather picking up, the wood with their spear-pointed ovipositors. This is a double organ, and hence makes two wounds in the wood, and these diverge slightly from one another. In these wounds, among the fibers of the wood the long, cylindrical, white eggs are laid. In time these wounds heal over. Fig. 11 represents branches, in one of which the wounds are completely healed, leaving a scar for each pair of wounds, another partly healed, and a third in which the eggs have been but recently laid; the last two have been shaved away a little in order to show the two divergent places in which the eggs are laid. So soon as the eggs are hatched, the larvæ instinctively fall to the ground, enter it, and for seventeen years thereafter burrow through it, living probably upon the roots of trees and other vegetable matter. Fig. 9 represents this larva. At the end of this time it comes near the surface, changes to a pupa, in a very short time comes to the light, climbs up a few inches on the trunk of a tree, a fence, or other object, its skin splits along the back, and through the rent thus made the now adult insect escapes. After a few hours' exposure to the air, its skin has become hardened, its wings firm and rigid enough to serve as organs of flight. It flies to the tree tops, there to live a brief time before it lays its eggs and dies. The cases of the pupa, Fig. 10, may be found in great abundance during "locust year" and sometimes for several years after. Fig. 8 shows a view of the adult male locust with its wings outstretched, and a side view of a female, (one wing partly cut away,) in which the ovipositor attached to the abdomen is shown, and also the beak, a characteristic part in all hemipterous insects, attached to the head. The marvelous life history of this insect has been fully verified by the extended observations of naturalists in many parts of the country.

In the family of beetles, we have a large number of species, which, while they agree in general characters, differ very much in minor details of structure and habit. Fig. 12 represents one of the weevil kind whose injuries may often be seen in the dead tops of our pine and spruce trees. In laying its eggs, it selects the leading shoot of these evergreens, cuts into it with its powerful snout, and deposits there an egg, which, on hatching, gives rise to a white fleshy grub. This grub finds ample sustenance in the nutritive parts of the stem which surrounds it. It moves but slightly from the place where it was first produced, and the pupa into which it grows rests quietly in the same burrow. The adult insect shows plainly the characters of all of the weevil kind, and readily escapes to surrounding trees, which in turn have their shoots affected in the same way. In some trees, the work of this insect is very conspicuous, and the trees are deformed thereby for a long time. Generally they send out a new leader in time, and may become more thickly branched for this enforced shortening in process. The elm-leaf beetle, shown in Plate III, Figs. 1 and 2, is of quite different habit. It is a comparatively new-comer in this country, but has attracted a good deal of attention because of the great destruction which it causes to the leaves of elm trees. The eggs are attached to the leaves or stems, and the young larvæ, which are quite caterpillar-like, feed at once upon the tissues of the leaf. In time the trees become riddled with holes, and trees badly infested are rendered very unsightly, and their growth is impeded. Continuous injury of this kind to leaves will destroy the trees themselves. There are still many parts of the country in which this beetle is unknown, and it is to be hoped that the remedies employed against it may prevent its becoming widespread.

The *Diptera* or flies present considerable variety in size and form, but are generally quite easily distinguished by the single pair of wings, and the small rudiments which probably stand for the second pair. In habit they are not all alike.

Fig. 3 represents a sweat-fly, a very beautiful insect in form and color. Its body is marked by yellow and black blocks and lines, so that it is often mistaken for a wasp, many of which have very similar markings. The eggs of this fly are laid among colonies of plant lice, and the larvæ which are very simple and worm-like, feed upon these lice, sucking the juices from their bodies and casting away the empty shriveled skins, which may often be seen in great numbers among a colony of these minute pests. From this circumstance, it is very plain that the sweat-fly is a most useful insect, and any close observer may see that were there no sweat-flies, these minute, sucking plant lice would be much more plenty and injurious than they now are.

Among the butterflies and moths, the number of examples is so great that it is difficult to make a choice of representative ones. Many are small or of little economic interest, others are among our most injurious or beneficial insects. Fig. 4 shows the details in the life history of the codling moth, which has acquired notoriety by the great injury which it causes to our apple crop. So well known are the ravages of this insect that but little description need be made. The larva, a whitish, fleshy grub, is known to all who eat apples. It feeds first upon the center or core, later upon any and every part of the fruit, often destroying it, or causing it to fall prematurely. Having finished its growth, it spins a light cocoon of silk in some crevice, and there awaits its transformation to the adult state. The eye of the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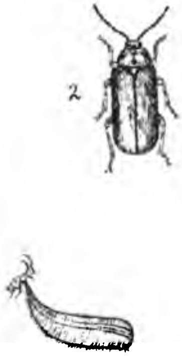
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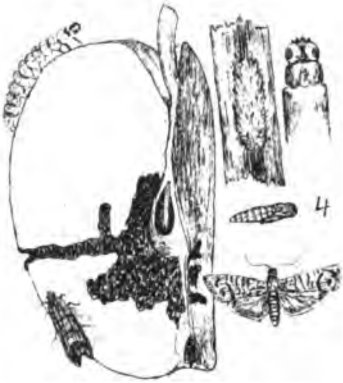
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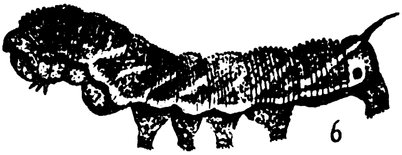
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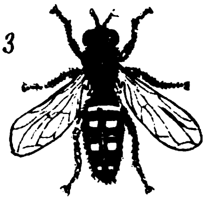
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apple is the place where the eggs are generally placed. From thence, the young more readily find the rich store of food which lies so near at hand.

A much more conspicuous moth, because of its size and habits, is the Carolina Sphinx, Fig. 5. It may be found in early evening, flying about wherever there are flowers from which it can draw honey, its favorite food. When it reaches a suitable flower, it quickly uncoils its long proboscis, half concealed on the under side of the head, thrusts it into the base of the flower, and sucks the nectar into its stomach. The quick flight, ease in poising its body, and its long proboscis, easily mark these species among our larger insects. Its larva, Fig. 6, popularly called a green worm, is found on the tomato and potato, feeding upon the leaves, of which it can eat a large quantity. There are several larvæ of other species often associated with this, and each is marked by peculiarities of size, coloring, &c. The sphinx larvæ pass their pupa state, Fig. 7, in the earth. Their large brown-skinned bodies, at one end of which is a peculiar, curving part, like a horn or handle, are often brought to the surface in digging potatoes. Beneath the skin may be seen the forming wings and legs of the adult. Were this moth more prolific than it is, or less subject to accident and the attacks of parasites, its larvæ would be so abundant as to do great injury.

In the order of *Hymenoptera*, where the most highly-organized and intelligent insects are classed, I have taken as an example a minute parasite shown enlarged in Fig. 10. It is a representative of a large number of markedly beneficial insects called ichneumon flies. They are not true flies, however, as is shown by their wings, which are four in number, and not veined as are the wings of flies. The mode of life of this species is as follows:

The adult, when ready for egg-laying, seeks the large, green larva of the sphinx moth just described, and boldly pierces its skin by means of a sharp ovipositing apparatus projecting from its abdomen. Into the opening thus made it thrusts an egg. This action is repeated until its eggs are all laid. The eggs soon hatch into small, white worms or larvæ, and proceed to feed upon the abundant store of food about them. They literally eat their large, green host alive. But his death is a slow one, and does not occur until the parasites have escaped. This they do so soon as they have finished their larva state. Instead of entirely abandoning the host, however, they come to the surface of his body, and then each spins a cocoon of silk, in which it is securely concealed and protected. This cocoon is fastened to the skin of the host as it is spun. Fig. 9 shows the different stages in the process of spinning, as it may be followed by the use of a low power of the microscope. A host which has been parasitized is at first very uneasy, but so soon as he finds that he cannot rid himself of his tormentors, and is weakened by their attacks, he becomes very quiet, refuses to eat, and remains in the same place and position hour after hour.

When a little larva is ready to transform, it works its way through the skin of the host head first, and as soon as it has nearly freed itself, it flexes its body so that it forms a loop, thus bringing its head down to its tail. A fine thread of white silk then issues from its head, with which it fastens the posterior part of its body to the body of its host by a few stay lines; then begins the spinning of the cocoon proper. Starting upon one side of its body, the silken thread is fastened, and carried across to the other side (about half the circumference of the body only) in a series of coarse loops, as illustrated in Fig. 11, thence back over the same course until directly over the starting-point. Wherever the threads touch they adhere. So it spins, zigzagging its way across its body, until it has spun a loose, sleazy net of fibers over nearly the whole front half of its body. Then it ceases to fasten to its body, but continues to spin in other respects as before. Finally, standing on tip-toe as it were, it spins overhead as far as it can reach. The form thus made is like a rude slipper, with a curved toe. By this time the silk fibers have dried and hardened somewhat, and the frail structure can stand upright without the help of its maker. By a series of writhing movements the little worm now breaks away the attachments to its body, and the constantly drying net-work has become firm enough to support the worm. The latter then turns upside down. This is apparently a difficult feat, but is easily accomplished.

The habit of this particular species is then to flex the body again, leaving it supported, as indeed must be the case, by the frail cocoon alone, and, beginning at the toe of the slipper, it spins regularly downward until it has reached the starting-point, and the framework of its prison is complete. Then it proceeds to line it, spinning backward and forward with the regularity of a machine, putting on layer after layer, until the cocoon has become opaque, and the process can be watched no longer. In this beautifully made structure it undergoes its pupa state, and eventually comes forth the perfect insect like its parent. Escape from the cocoon is made by cutting a line around the upper end, which permits the turning back of the apex as a lid.

Fig. 8 shows a sphinx larva, the body of which is covered with these cocoons, and above are several of the parasites about natural size.

They are very efficient agents in checking the increase of this and many other species of injurious insects.

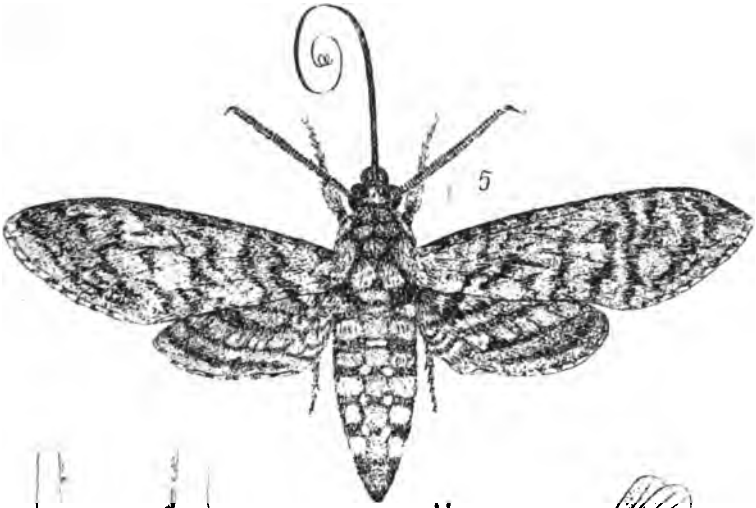
AGRICULTURAL SCIENCE.

By JOSEPH WILLCOX, Esq., *Media, Pa.*, *Mineralogist of the Board.*

The question has been referred to me for reply: "In what manner does science benefit agriculture?" If we were to judge by the indifference manifested by farmers in regard to scientific knowledge applicable to their calling, we would think that they do not consider that science does materially benefit agriculture. No branch of industry is necessarily dependent upon so many of the elements and forces of nature as agriculture. Earth, air, water, heat, light, and electricity, all contribute to its requirements. Yet how little thought is given by farmers to the subject of their profession, except to the mechanical operations of the farm. Every practical farmer knows the proper time to plant seed, how to attend to the growing crops, and when to gather them. He knows what food is good for his stock, but few only know what the growing crops require. In this paper I do not profess to announce anything new, but the purpose I have in mind is to present a few facts for consideration, and a few suggestions for thought and study, addressed especially to our young farmers.

Though the pursuit of agriculture is of ancient date, exact science applicable to it is comparatively recent, and is, at the present time,

PLATE IV.



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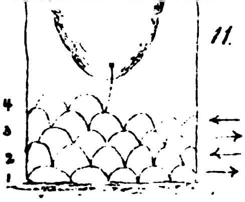

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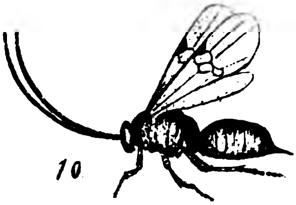

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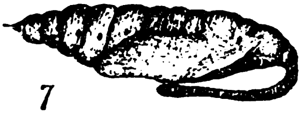

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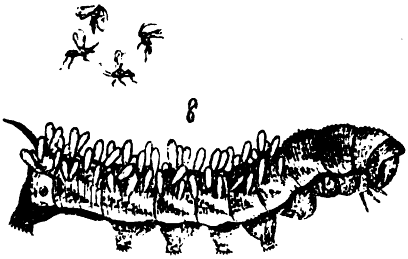

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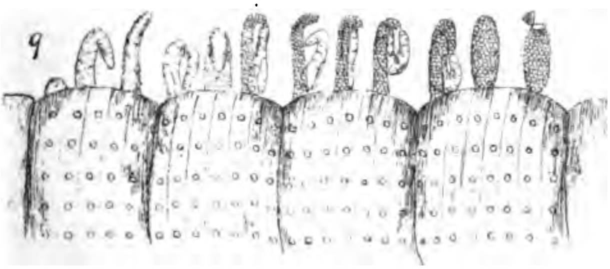

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eminently progressive. Much has been accomplished for the benefit of agriculture by science, yet much remains to be done before the full benefit of its teachings will be realized. The farmer should be educated to understand the teachings of science, and how to apply them intelligently. In nearly every branch of industrial pursuits, except agriculture, it is considered important to study, not only the mechanical, but also the scientific details of the business, where such appertains to it. He who is ambitious of success at farming should not be contented with the knowledge only of the mechanical operations of his farm. The opinions of his grandfather alone should not satisfy him, and regulate his methods of cultivation. His acres of grass and grain should be, to him, fields for the exercise of much thought; and he should seek for and study the opinions of those most advanced in the sciences pertaining to his calling. The high price of land, now prevailing in the thickly-populated portions of our country, makes necessary a large yield of crops, to effect a moderate return only on the investment. The rapid exhaustion of the fertility of the land in many districts, where no return is made to the soil, will make artificial fertilization a subject of serious consideration to the owners in the future. In the former case, the question of abundant plant-food is now urgent, in order to produce large crops. In the South and West, where land is cheap, it is less expensive to abandon an exhausted field and buy a new one, than to fertilize the old field. But where the value of land is great, the important question is: "How can the fertility of the soil be much increased and maintained at a reasonable cost?" In order to do this intelligently, one should know what the soil needs.

Science teaches us that the rocks of the earth contain all the mineral substances to be found in plants, and that the air contains all the other substances necessary to promote their growth. The soil has all been disintegrated from the rocks by such agencies as heat, frost, rains, and atmospheric air, through a long period of time. Along the roadside, in the deep cuts, rocks may frequently be seen in the different stages of disintegration, from hard rock to soil. Plenty of stones may easily be found illustrating the progress of the change from rock to soil. While the interior is solid, unaltered rock, the exterior portion is altered into soil, and is crumbled in the hand. The red appearance of the soil is due to the peroxide of iron, which existed in the rock as the protoxide, or first degree of oxidation. Now, this soil on such stones, as well as all soil on the earth, is only partially decomposed, and each year a further decomposition will take place. By the process of decomposition of the soil, the elements necessary for plant growth are liberated from their original combination, and rendered soluble and available. This is a very slow process, but in the course of time an exhausted soil will again become productive. Although only a small proportion of the weight of plants is mineral matter (from one to five per cent.) still it is indispensable. Of all the elements found in the world, only a comparatively small number are found in plants.

The substances most necessary to plant growth are phosphoric acid, potash, lime, soda, magnesia, silica, sulphur, chlorine, carbon, nitrogen, oxygen, and hydrogen. The four latter are found in the air, all the rest in the soil. Although these substances vary in different classes of plants, they are all necessary to them. Some plants are able to obtain, from the atmosphere alone, all the substances necessary for their sustenance and growth, including the full proportion of mineral matter, such as the air plants in Florida, but they do not grow rapidly. Still they demonstrate an important fact in vegetable economy, that the air does contain every essential element of plant growth.

As a general rule, the cereals require large amounts of phosphorus and potash; the clovers and tobacco, large amounts of potash and lime; the root crops, large amounts of potash. The most important mineral substances are phosphorus and potash. Now if the process of decomposition of the soil was so rapid that the necessary mineral substances would be liberated and made soluble, as fast as the crops could assimilate them, then the problem of the perpetual supply of plant-food would be solved. But the process does not proceed so rapidly as to supply a vigorous crop without drawing upon the previously accumulated store. The greatest supply of potash is derived from feldspar, extensively distributed among many rocks, while all of the rocks contain a small amount of phosphorus, according to the recent investigations of Prof. Genth, when making analyses of rocks for the Geological Survey of our State.

A virgin soil yields liberally its accumulated store of soluble mineral substances to growing crops. But soon each succeeding crop manifests a diminution of its growth, unless new essential elements are added. Sometimes there may be a deficiency of only one or two substances, but their absence will be as disastrous to some crops as the deficiency of all, and great fertility may be accomplished by the addition of the one or two needful substances.

The greatest store of material suitable for plant-food in the soil is found in many portions of our Western States, where the land was formerly the bottom of lakes and broad rivers.

It may be asked, how are we to ascertain in what respect our soils are deficient, so that we may buy chiefly what is most needful? I will reply. You have the best chemists on your farm, and plenty of them. Highly skilled in agricultural chemistry, they make no mistakes. They are the medium that a bountiful Providence has placed at our disposal, to indicate to us the requirements of our soil; and the study of their teachings should be an all-important and perpetual subject of concern to every farmer. Every stalk of corn and wheat and grass is a practical chemist; and they will elaborate from the soil valuable products, if the materials are supplied, or point out deficiencies, if they occur. They will most emphatically pronounce what are good soils and what are poor; and if the farmer will consult intelligently with them, they will indicate to him what substances he should supply. The habit of careful observation, supplemented with the necessary knowledge, is a subject, the importance of which can not be overestimated.

The farmer might wisely apply potash to a small portion of his crop, phosphate of lime to another, and both of these substances to another portion. An increased of production over other portions of the field not so treated would indicate deficiencies of those substances in the soil at the place. Experiments of like character, performed on some fields each year, would enable every farmer to know just what is required to keep his land in a high condition for cultivation, if he intelligently profits by such opportunities.

Fortunately, some of the most available fertilizers promote the decomposition of the soil. Barn-yard manure, when decaying in the ground, liberates carbonic acid, which is an important agent in decomposing soil. Potash also assists in breaking up insoluble combinations; and thus it not only offers its own substance to be utilized, but brings in new recruits to be enrolled in the good cause of building up plant-structure. He who can purchase, at a reasonable cost, a sufficient amount of stable manure need feel no concern about any other fertilizer. But in the case of the farmers who live at a distance from cities, their ability to cultivate crops is very limited, unless they buy artificial fertilizers. I think the time should soon come when no farmer should acknowledge that his prosperity is wholly dependent upon the size of the manure pile in his barn-yard; and that all his hopes and expectations are governed and limited by it. Many now purchase, it is true, large amounts of the modern fertilizers, often with good effect, and not unfrequently with disappointment in results. But is there any class of people who purchase habitually an important material in their business operations with so little intelligence and judgment as the farmers when they buy their fertilizers? How many, in the first place, know what their land requires; and how many of them know what they get when they buy? Before one can buy intelligently, he must first know what his needs are.

A farmer, depending alone on the usual supply of manure in his barn-yard, makes his living, but he does not often save much money. A cow will give a small supply of milk, if fed with hay alone. But as it pays better to feed a cow liberally with grain, so it would be good policy to feed generously growing crops of grain and hay. It would be considered unwise to build two mills and run them half time, to perform the work that one would accomplish if run full time. So it would be good policy to work land to its full capacity, which can only be done by a liberal supply of plant-food.

Some plants, rich in nitrogen, can obtain their supply of that element from the air. I once saw red clover growing vigorously on a dump heap of decomposed feldspar, hauled from a mine. The supply of organic matter, in that pile, must have been very small, as the feldspar was dug out many feet below the surface of the ground.

Among the good works accomplished by our State Board of Agriculture, none, in my opinion, more forcibly illustrates the benefit of science to agriculture than the published list of the commercial fertilizers sold in our State; stating the prices at which they are sold to farmers, and also the true value of them, according to the market price of the substances of which they are composed. These analyses and estimates were made by Prof. Genth, whose name is a sufficient guarantee for their reliability. I would recommend every farmer to read this paper attentively. From an inspection of it, the true cause may be seen why so many manufacturers of fertilizers make money much faster than farmers. I will refer to two fertilizers in this list that appear to me to deserve especial attention on account of the great discrepancy between their true value and their selling price. No. 85, estimated value two dollars and five cents per ton, selling price, fifteen dollars per ton. I cannot find anything to warrant this except a change of name. To call marl "Fossil Alkalite," and sell it under that name at fifteen dollars per ton, when it is worth only two dollars per ton under the name of marl, is, I consider, too much for the use of a name. Take another case, No. 121: this contains eight hundred pounds per ton of a cheap, natural product (diatomaceous earth) found in great abundance in some localities, especially in Virginia, near tidewater. This earth (a hydrated silica) may be of some value to certain crops, and if it was offered at a reasonable price per ton, above the cost of digging and transporting it, no complaint would be made. But when such a cheap commodity is mixed, in large proportions, with something else, and the charge made of forty-five dollars per ton, I feel obliged to protest against its sale at such an inordinate price. In some cases, the nitrogen in fertilizers lies dormant and inactive for many years, in the condition of hair and ground hoofs, before decomposition is effected. Such should be avoided if the farmer desires quick results. It may be asked what are some of the safeguards to be recommended in the purchase of fertilizers. Before one purchases, he should, as far as practicable, find out what he needs, as I have explained above. But to obtain that knowledge requires time. In my opinion, it would be a good plan for several farmers to combine in the purchase of a large lot, from a reliable and responsible manufacturer only, and demand from him a statement of the analysis of it. If the composition and price are satisfactory, they can, at a small cost from each, have the lot re-analyzed by a chemist of their own selection, and a true estimate made of its value, holding the seller responsible if found inferior to the guarantee. It is feared by many that a large amount of valuable material in fertilizers is lost by rains percolating through the soil and carrying away the dissolved substances. Both science and experience have taught us that earth extracts from water the substances necessary for vegetation. In other words, the elements which the soil retains or extracts from percolating waters are precisely those which are removed from it by growing plants. Thus a two-fold duty is performed by the soil in purifying contaminated waters, as the substances most injurious to human life are those much needed by growing plants.

It may be asked what are the cheapest and most available forms in which phosphoric acid, potash, and nitrogen may be purchased separately. Sylvanite, or the hydrated muriate of potash, in lots of ten tons, costs about two and a half cents a pound. This substance contains about fifty per cent. of potash. Kainite contains twenty-three to twenty-five per cent. of sulphate of potash, and costs nine to ten dollars per ton in large lots. This substance contains about ten to twelve per cent. of potash. Nitrate of soda, one of the best forms in which nitrogen can be obtained, costs about four cents per pound. By consulting the "Tabulated Analysis of Fertilizers," information may be obtained how and where to buy phosphoric acid at a fair price, and the importance of this table may then be appreciated. Orthoclase feldspar, a common constituent in crystalline rocks, contains sometimes sixteen per cent. of potash. Hornblende, also a common rock, contains twenty-four per cent. of magnesia, and ten per cent. of lime.

If a stalk of grain could speak, it might truly say to many farmers, "Like you, I live—like you, I must have food and drink to support life. You wish me to grow fast and large; and yet you stint me in supplying the substances necessary for my development. You feed your own children liberally to make them grow, while you put me on a low diet, expecting me to perform what you should know is an impossibility. Your prosperity depends upon the vigorous growth of mine and kindred species of plants, yet how little thought have you given to the study of our habits and needs. We do succeed, to a moderate degree, in spite of your negligence, and that fact encourages you to continued neglect."

REPORT OF COMMITTEE ON DAIRY AND DAIRY PRODUCTS.

By EASTBURN REEDER, *Chairman*, *New Hope*, *Pa.*

Our last annual report, made at the autumn meeting of the Board, held at Lancaster, September 30 and October 1, the trial in the Dauphin county oleomargarine case had just been concluded, and we were all waiting for the decision of Judge Simonton. That decision was not made public until about the time of the December meeting of the Board, held at Bloomsburg, and was a full vindication of the constitutionality of the law. In this decision, the Legislature is fully recognized as a coördinate branch of the government, as the law-making power, and the right of the Legislature to pass the law fully affirmed. Notice of intention to appeal to the Supreme Court was served in due season. In the meantime, a number of prosecutions were made by the Committee of the Farmers' and Dairymen's Protective Association, under the law, against dealers in Philadelphia, West Chester, and Doylestown. It was found that, in some instances, some of the largest dealers in Philadelphia were supplying oleomargarine to our normal schools, and other public institutions. These prosecutions all resulted in convictions, and in all cases the convicted parties gave security for the payment of the fines imposed, and are awaiting the decision of the Supreme Court.

In sustaining and enforcing our State laws, the committee before referred to have raised and expended over one thousand dollars, the voluntary contributions of farmers, dairymen, creameries of Philadelphia, and the neighboring counties of Bucks, Chester, Delaware, and Montgomery, with a small contribution each, from Bradford and Dauphin counties. The argument before the Supreme Court was made at Harrisburg the first week in June, 1886. The counsel representing the oleomargarine interest were Watson, of Pittsburgh; Brewster, of Philadelphia, and Gilbert, of Harrisburg. The Commonwealth was represented by Hall and Jordan, of Harrisburg, and the Hon. Wayne McVeagh, of Philadelphia. It is expected that the decision of the Supreme Court will be announced early in October.

At the time of the last autumn meeting of the Board, or shortly after, His Excellency, the Governor, appointed and commissioned two members of the Committee on Dairy Products, viz: Messrs. Reeder and Oliver, to attend the twelfth annual convention of the National Butter, Cheese and Egg Association, to be held in the city of Chicago. A full report has been made by this commission, and placed on file in the Department of State at Harrisburg. We found the Western men even more excited and indignant over the frauds practiced upon the dairy industry than their Eastern brethren. The discussion of this question occupied the greater part of the time of the convention, and the decision reached was to apply to Congress for National legislation. Accordingly, the Scott-Warner-Miller bill was introduced by Representative Scott, of Pennsylvania, in the House, and Miller, of New York, in the Senate.

This bill, as originally introduced, imposed a tax of ten cents a pound upon oleomargarine, or imitation butter, besides license taxes of various amounts upon manufacturers and dealers. After a long and bitter struggle, this bill was amended, reducing the tax to five cents a pound in the House, and still farther reduced to two cents a pound in the Senate, and finally passed. Whether this law, as passed by Congress, will operate as a benefit or an injury to the dairy industry appears to be an open question, upon which agriculturists are not agreed. On the one side, it is claimed that this law will effectually prevent all fraud and deception. The article can only be sold upon its own merits, and for what it is. This, it would seem, is all the protection the dairy interest has a right to ask for. On the other hand, it is urged against the law that it legalizes the business, and places the stamp of the government upon it. That this will give it a standing and a sale greater than it has ever yet had; and that the low licenses and taxes imposed will be paid by the larger manufacturers, and its manufacture still continued at a profit.

In this connection, we observe that the manufacture depends upon the sales; if it cannot be sold, it will not be made, and we desire to call attention to a remark of President Cleveland in his message to Congress approving the bill. He says: "If this article has the merit which its friends claim for it, and the people of the land, with full knowledge of its character, desire to purchase and use it, the taxes enacted by this bill will permit a fair profit to both manufacturer and seller. If the existence of the commodity taxed, and the profits of its manufacture and sale, depend upon disposing of it to the people for something else which it deceitfully imitates, the entire enterprise is a fraud, and not an industry; and if it cannot endure the exhibition of its real character, which will be effected by the inspection, supervision and stamping, which this bill directs, the sooner it is destroyed the better, in the interest of fair dealing."

The case is fairly stated here, and we should patiently await the result of the action of this National law. We now have the anomaly presented to us of a prohibitory law forbidding the manufacture and sale in our own State, and a National law of Congress licensing and regulating both the manufacture and sale in all the States. What the outcome of this conflicting legislation will be, will be determined in the future. We can only await results, and place our trust in these lines of the poet:

"As round and round we run,
Ever the right comes uppermost,
And ever is justice done."

And while we are thus waiting, let us now take a brief glance at our present condition. In order to determine the present condition of the dairy industry in our State, circulars have been prepared and sent to members of your committee and members of the Board in several of our principal dairy counties. The answers to these inquiries are shown by the following reports:

Question No. 1.—What is the present condition of the dairy industry in your county?

Adams county—Like all other agricultural pursuits, depressed at the present time.

Bradford county—Owing to the late increase in price, present condition more prosperous.

Bucks county—Present condition improved.

Chester county—The last three weeks the market is in a good condition.

Columbia county—There is no organization of dairy interests in our county, therefore the industry cannot be very profitable or prosperous.

Crawford county—The condition at the present time is as good, or better, than for the past five years.

Somerset county—Good, with an improving tendency.

Wayne county—Condition somewhat depressed during present season; prospect a little brighter now.

Question No. 2.—What have been the prices for butter in your county during the past year?

	Highest price.	*Lowest price.*	*Present price.*
Adams county,	18	18	12
Bradford "	20	14	20
Bucks "	36	18	32
Chester "	40	20	35
Columbia "	28	10	20
Crawford "	25	18	18
Somerset "	28	12	—
Wayne "	22	14	20

Question No. 3.—What is the average price of good fresh dairy cows?

Adams county—From thirty-five to forty-five dollars, depending upon degrees of fine blood.

Bradford county—Thirty dollars.

Bucks county—Recent sales indicate fifty dollars.

Chester county—From forty-five to fifty-five dollars.

Columbia county—Twenty-five dollars.

Crawford county—Thirty dollars.

Somerset county—Twenty-five dollars.

Wayne county—About thirty dollars.

Question No. 4.—What is the average price of yearling heifers?

Adams county—From fifteen to twenty dollars.

Bradford county—About twelve dollars.

Bucks county—Fifteen dollars.

Chester county—Fifteen dollars.

Columbia county—Fourteen dollars.

Crawford county—Fourteen dollars.

Somerset county—Fifteen dollars.

Wayne county—Fourteen dollars.

Question No. 5.—To what extent is cheese made? and give present price.

Adams county—Not any.

Bradford county—Very little made.

Bucks county—To a very limited extent.

Chester county—Half the year of skim milk. Three cents.

Columbia county—None.

Crawford county—Exclusively at all the factories. Twelve and one half cents.

Somerset county—Made in three factories. Eleven cents.

Wayne county—None made now. One cream-gathering butter factory.

Question No. 6.—What proportion of the milk is taken to creameries?

Adams county—Not prepared to answer.

Bradford county—Very little. But few creameries. Milk is sent down the L. V. R. R.

Bucks county—Seventy-five per cent.

Chester county—Fifty per cent.

Columbia county—None.

Crawford county—Forty per cent.

Somerset county—As far as creameries go, about three fourths.

Question No. 7.—What prices have been paid for milk at creameries the past year?

Adams county—Highest, one dollar per one hundred pounds; lowest, seventy cents; present, eighty cents.

Bradford county—Highest, fifteen cents per quart for cream. Highest five cents per quart for milk; lowest, two and one half cents; present, two and one half cents.

Bucks county—Highest, one dollar and thirty-five cents; lowest, seventy cents; present, one dollar.

Chester county—Highest, three and one half cents per quart for milk; lowest, one and three fourth cents; present, three cents.

Crawford county—No milk is sold. It is worked up for a percentage.

Somerset county—Highest, one dollar; lowest, fifty-five cents.

Question No. 8.—What is the condition of the dairy industry compared with the last ten years? Let one hundred represent average condition.

Adams county—Seventy-five per cent.

Bradford county—Owing to the late increase in price, would be about an average of one hundred.

Bucks county—Seventy-five per cent.

Chester county—Ninety per cent.
Columbia county—Ninety per cent.
Crawford county—Fully as profitable now as at any time—one hundred.
Somerset county—About an average of one hundred.
Wayne county—Seventy-five per cent.

Question No. 9.—Is the dairy industry in need of any legal protection?
Adams county—Yes; by all means.
Bradford county—Yes; some means to prevent imposition by fraudulent butter.
Bucks county—It is.
Chester county—We are waiting to see the effects of the National law.
Columbia county—No need of any legal protection in this county.
Crawford county—It does.
Somerset county—None, if the law now enacted is put in force.
Wayne county—Yes.

Question No. 10.—What means can you suggest that will advance the dairy industry?
Adams county—Put every person who makes counterfeit butter in the penitentiary, and there leave them to earn their bread and butter honestly.
Bradford county—More care in the manufacture, and in selecting stock.
Bucks county—We are waiting for the decision of the Supreme Court on our prohibitory law, and the effect of the National law passed by Congress.
Chester county—We are waiting to see whether the Supreme Court confirms our State prohibitory law.
Columbia county—The dairy interest may be much advanced by giving more attention to the improvemt of dairy stock.
Crawford county—We are waiting to see the outcome of the National law and the decision of our Supreme Court.
Somerset county—More feed.
Wayne county—A rigid enforcement of both State and National oleo. laws, and a more general and thorough organization of dairymen.

REPORT OF THE COMMITTEE ON SILK AND SILK CULTURE.

By Dr. J. P. BARNES, *Chairman*, *Allentown*, *Pa.*

The Committee on Silk and Silk Culture feel that the advances made in the past in silk culture in Pennsylvania are so meager that no practical facts of encouragement can be given to stimulate or induce others to take a progressive step in that direction.

The individual efforts heretofore made have been of very limited attempts, so much so that no reports of the result can be furnished, and our only expectant hope is that in the future this important product may yet, to a considerable extent, be raised, even in Pennsylvania.

Why silk culture should not become a general occupation, and give employment and support to hundreds and thousands of needy families, is a question for our citizens to inquire into, for the purpose of remedying and establishing so important a production.

The numerous silk mills springing up in our State for converting the raw material into fine fabrics are entirely dependent upon foreign raw material. This should not be the case; therefore, the importance of exertion to produce here at home that for which we now entirely depend upon China, Japan, and Italy, and other foreign countries, to supply.

Silk culture is a noble and worthy enterprise, and should be encouraged. It is an industry by which many idle children can be brought into habits of profitable employment, by awakening in them an interest in systematic application of art to industry—for children who are taught to use their hands, as well as their heads, are best fitted for almost any vocation. With the soil and climate favorable to the growth of the mulberry tree, with our thickly populated country of intelligent people, with the large demand at our very doors, for the raw material to be converted into valuable fabrics, why should not this infant enterprise be taken hold of and grow to become one of the principal occupations of our country?

We compete and excel in many departments of manufacture with the old country, and why should this gigantic enterprise lie dormant, and allow the large sums of money required for the purchase of the raw material to go abroad, when we have all that is required to produce it here at home? If possible, should we not make a strong effort to keep that money here, to support our own people instead of sending it to other nations?

The manufactured article can be produced in this country equal in quality, if not superior, to that made abroad, and at such cost as to compete with the foreign production. If the way could be opened to produce the raw material here at the same price as that now paid for the foreign article, what an addition could be made to our national wealth.

The Woman's Silk Culture Association of the United States, during the first year of its existence, 1880, was devoted to organizing, and issuing circulars, and corresponding with those who were deemed the proper people to undertake the silk industry of America. Their first year, therefore, shows only the beginning of the effort, and the first annual and subsequent reports show the following table from April 18, 1880:

1880,	Trees and	Eggs, $75 25.		
1881,	" "	" 634 08;	Cocoons, $229 49.	
1882,	Trees, $575 33;	Eggs, 267 20;	Cocoons, 328 36;	Reeling, $124 25.
1883,	Trees, 291 59;	Eggs, 57 72;	Cocoons, 610 48;	Reeling, 97 50.
1884,	Trees, 8 38;	Eggs, 35 00;	Cocoons, 987 57;	Reeling, 253 18.
1885,	Up to Jan. 1,	Eggs, 9 50;	Cocoons, 1,820 12:	Reeling, 840 85.

Total amount paid by the association for eggs, cocoons, and reeling to the women of the United States, upwards of $6,015 49.

The gradual decrease in the amount of eggs, (both bought and sold,) is caused by the action of the Department of Agriculture of the United States sending out gratuitous seed.

The distribution of money paid for cocoons by the Women's Assotion from April, 1884, to January 1, 1886, has been as follows: To Illinois, $688 25; to Ohio, $491 47; to Kansas, $276 89; to Iowa, $221 41; to Pennsylvania, $193 08; to Indiana, $165 47; to Georgia, $67 25; to Florida, $38 99; to Alabama, $29 92; to South Carolina, $29 01.

The silk market of the United States for the month of December, 1885, shows the import of raw silk at the port of New York, to have been $1,019 112.

Of manufactured silk goods,	$1,729 395
Of raw silk at port of New York and San Francisco,	2,907 989
Of waste silk at port of New York,	170 728
Total,	$4,808 112

Expenditures by the Agricultural Department at Washington, D. C., of the fund in aid of silk culture to December 4, 1885, and estimates to June 30, 1886. are as follows:

	Expended.	*Estimated.*	*Total.*
Washington salaries,	$1,943 38	$2,402 30	$4,345 68
Purchase of eggs,	1,415 24	182 85	1,598 13
Miscellaneous,	280 30	378 15	653 41
	$3,638 92	$2.958 30	$6.957 22
San Francisco,	$1,212 98	$2,609 26	$3,822 24
New Orleans,	1,933 75	415 00	2.348 75
Philadelphia,	1,016 26	1,215 53	2,231 79
Total,			$15,000 00

We have now over three hundred and eighty silk factories or mills in the United States filled with busy artisans, and increasing rapidly as the demands of our nation increase. Is not this sufficient encouragement to urge upon our agriculturists, by all means, legitimate and honest the planting of silk industry in the United States?

The investments made in the manufacture of silk in this State within the past twelve months have amounted to nearly $2,000,000. Factories have been located at Easton, Bethlehem, Catasauqua, Mauch Chunk, Allentown, Reading, and Strasburg, Monroe county, and one at Philipsburg, N. J., just across the Delaware river, opposite Easton.

In each town where they have been located, the residents have been asked to subscribe to the enterprise, in order to induce the manufacturer to locate, and at the same time feel an interest in the undertaking.

The mills which have commenced operations are doing well.

REPORT OF THE COMMITTEE ON WOOL AND TEXTILE FIBRES.

By JOHN McDOWELL, ESQ., *Chairman*, *Washington*, *Pa.*

To State Board of Agriculture Meeting at Scranton, *Pa.*, *June 16*, *1886:*

The Committee on Wool would respectfully submit the following:

The magnitude of the industry involved in this subject seemed to require facts and opinions from persons engaged in the industry who reside in different States who are interested in some way as growers, dealers, or manufacturers. To this end we had a large number of circulars printed and addressed to prominent persons of experience and observation. The following is the form of the circular sent:

DEAR SIR: I hope you will pardon me for intruding upon your valuable time. I am gathering information from different places to aid me in preparing my report to the Pennsylvania State Board of Agriculture, of which I am a member. The Board will meet in Scranton, Pa., about June 16. I am chairman of the Committee on Wool and Textile Fibre, and required to report at that meeting. Will you be kind enough to answer the following questions:

First. Do you regard wool-growing in the United States and Territories as an industry essential to our national prosperity?

Second. Was there any other industry in 1880, when the census was taken, more generally and evenly distributed in the States and Territories than that of wool-growing?

Third. What has caused a decrease in the number of sheep in the States since the 1st of January, 1883?

Fourth. Can the United States and Territories produce all the wool needed for home consumption at such prices as will compensate the grower and justify the consumer in buying the same when fabricated in American mills?

Fifth. If wool is placed on the free list, what effect will it have on the grower and what effect on the manufacturer?

Sixth. In the event that wool-growing in the States should gradually die out, would the number of sheep in that portion of the United States west of the Mississippi increase or diminish? Would it ever furnish enough wool for home consumption?

Seventh. Under the policy of free wool, could the States and Territories successfully compete with the wool-growers of Australia, South America, and Russia in the markets of Boston, New York, Philadelphia, and St. Louis?

Eighth. What are some of the principal hindrances to profitable wool-growing?

Ninth. Which suffers most, the grower or the manufacturer, from the agitation of the revision of the tariff on foreign wool?

Please answer the above questions, and return the answers numbered, in time to embody them in my report, and oblige

Yours respectfully,

JOHN MCDOWELL,
Washington, Pa.

We have replies from a large number of persons of both political parties, nearly thirty. We present a few that also speak the sentiments or views of other letters received, which if time and space permitted we would submit entire.

The general harmony of the answers enables us to group together the views as expressed on each interrogatory, as follows:

First. All answer in the affirmative.

Second. A large majority say there was not.

Third. The cause is attributed to the repeal of the wool tariff of 1867.

Fourth. Answer in the affirmative. Some make a condition of adequate protection.

Fifth. The summing up of all the answers is found in the words "ruin and disaster."

Sixth. The interests of wool-growers are mutual; what affects one portion of our country affects all others.

Seventh. Answered in the negative.

Eighth. The general answer is agitation of the revision of the tariff, and dogs. One answers boldly, "Dogs and free trade men in Congress."

Ninth. Answered by some naming the grower, others say the manufacturer.

LETTER OF ALBERT CHAPMAN,

Wool-grower, Middleburg, Vt.

First. Most certainly I do. Very certainly as a free and independent nation.

Second. No industry that depends upon the sale of its product. It is possible the raising of breadstuffs to be consumed on the farm where raised may have been more evenly distributed, but it is doubtful.

Third. The great and constant increase of the number of sheep from 1867 to 1883, and the increase of wool raised, and the decline in the number of sheep and pounds of wool produced since 1883, point unquestionably to the reduction of the tariff on wool in March, 1883, thereby bringing wool so nearly into competition with foreign wool as to destroy the possibility of raising wool at home without loss to the grower, as the cause. There can be no other.

Fourth. I have no doubt we can, if the interests of the wool-grower and the manufacturer are adequately and equitably protected.

Fifth. It will stamp out wool-growing as an important and leading industry. Although the manufacturer may buy wool for a short time cheaper, in the end he will have to pay a larger price, and the very best and strongest fibred wool he now uses would disappear from our markets, and the consumers of cloth would suffer from being obliged to buy inferior and less durable fabrics.

Sixth. It would diminish. I do not believe it would furnish enough.

Seventh. No. And as those markets govern the prices in the smaller markets the wool-grower could not successfully compete with the foreign wool-growers.

Eighth. The Cobden Club. Their paid agents in this country: Partisan politicians who care more for the interests of their party than for the industries and prosperity of the nation, and who, by their continual or periodical agitation of the tariff question, keep the country in a state of uncertainty, and the wool-grower in doubt as to his market.

Ninth. I have no doubt the wool-grower does. It would seem to me this must be apparent to every man who thinks without prejudice, as the grower is at the bottom of the whole business, and a reduction must affect him most surely.

LETTER OF HON. JOHN M. STOCDALE,

Washington, Pa.

First. Hardly essential, but certainly necessary to the highest success and national independence.

Second. I think not, if all the States are included and the *general term agriculture* excluded.

Third. Partly unfavorable seasons, partly an anticipation that wool-growing was rapidly becoming profitless, but mainly because of the reduction in the tariff of 1867, the alarm that ensued, and the inadequate price of wool to the grower.

Fourth. Unquestionably in abundance and to spare, at prices just to all and sufficiently remunerative to secure a steady, reliable, and abundant production of wool, where price and quality would enable manufacturers to supply all demands at reasonable profits and yet low prices.

Fifth. To the grower it will furnish an additional burden under which he will stagger and probably fall, but to the manufacturer it will be at least a present benefit, largely enhancing his profits, provided protection is continued on woolen goods. It would seem incredible, however, that farmers should submit to a system of protection from all the benefits and profits of which they are excluded, and in whose burdens alone they are invited to share.

Sixth. At the beginning there would be very decided increase west of the Mississippi. There would not be half wool enough produced there, nor of the various qualities for home consumption, and as that country becomes settled, the land enhanced in value, and the public domain cease to be a legitimate object of plunder, the wool-growing interest would diminish and become feeble in the West as it had done in the East.

Seventh. "Free wool" for the market in which the wool-grower is to sell, and high protection for the market in which he must purchase, will be like a suicide where both jugulars are severed at the same time: the result will be sharp, quick, and decisive. The wool-grower will be bound in shackles, while his market will be wholly at the mercy of his foreign antagonist.

Eighth. The hindrances to profitable wool-growing arise partly from competition by foreign producers on cheap lands, aided by a genial climate; from inadequate duties, fraudulent valuations, classifications, and importations under an ignorant, corrupt, and inefficient customs system; and from a combined assault upon the market by brokers, wool manufacturers, and importers. The general depression of all industries must also be considered.

Ninth. The grower suffers most, and I might be added exclusively. The suffering of the manufacturer from the agitation of the tariff on foreign wool is a theoretical and not a practical hardship.

LETTER OF EDITOR "OHIO FARMER,

Cleveland, Ohio.

First. Most assuredly.

Second. There was none, unless you include general farming or dairy interest.

Third. The reduction of the tariff and the lower price of wool; general business depression aided in lowering price of wool.

Fourth. The United States, under proper protection and encouragement, can produce all the wool of any kind required, and at prices that will compensate growers and satisfy manufacturers.

Fifth. It will ruin the wool-growing industry of this country. At first prices on wool will be lower until our sheep are slaughtered; then, being at the mercy of foreign growers, and the world's supply being reduced so largely, *prices will go up higher than ever before.*

Sixth. In the event of free wool, the industry west of the Mississippi would weaken for awhile, until prices boomed, and then strengthen. Unless under strong encouragement, it never could supply home requirements.

Seventh. No.

Eighth. A vascillating government policy, which holds agitation like the sword of Damocles over this interest; lax State laws in regard to dogs, loose custom laws and superleivance which evades the politician the laws would afford, are among the leading hindrances.

Ninth. The grower suffers most, but the manufacturer suffers also. The injury done to the grower, however, may prove a benefit to the manufacturer in securing wool at a low price; the injury to the manufacturer, on the other hand, extends with double effect to the grower.

LETTER OF WM. T. SEAL,

Secretary of the Philadelphia Textile Association.

DEAR SIR: I have inserted your circular letter in the columns of the *Bulletin*, hoping that some one more competent to answer your questions may do so. I will venture answers to some of them.

First. Emphatically, yes.

Third. If a decrease, the low price of wool.

Fourth. I think not. It is a question whether some wools needed by our manufacturers can be grown in this country at all; if they can, the cost of doing it, perhaps, would preclude their use.

Fifth. A killing effect upon the grower, and in the end an injurious effect upon the manufacturer.

Sixth. 1st. Can't answer. 2d. Without a change in methods it would never furnish all the wools needed.

Seventh. Think not.

Ninth. Perhaps equally.

LETTER OF DR. B. RANDOLPH KEIM,

Sec. E. P. I. A. Editor the Tariff Record, Washington, D. C.

First. Wool-growing is as essential to our national prosperity as the production of any other unwrought material, and its protection and encouragement are in accordance with the recommendations of Washington, and every other patriotic American citizen from that day down to the present time.

Second. No other branch of industry was more generally or evenly distributed throughout the States and Territories.

Third. Repeal of the tariff of 1867, and uncertainty through agitations by pro-British manipulators.

Fourth. They can produce all the wool, and at proper prices with proper encouragement.

Fifth. If put on the free list, it would ruin the grower under existing economic conditions, and would ultimately ruin American manufactures through prices of raw materials regulated by foreign wool monopolies.

Sixth. The number under such circumstances *would be regulated by the demand for food without reference to the clip.*

Seventh. They could not compete under existing economic conditions. The value of American lands and labor, and cost of production would not admit.

Eighth. One of the hindrances is the incessant tinkering at the wool tariff.

Ninth. The grower suffers most first, and the manufacturer ultimately.

General Reflections.

WHAT FREE WOOL MEANS.

With the extraordinary increase in production under a protective tariff, the cost of wool has declined to the consumer, the farmer has improved the quality of the fleece, and sheep husbandry has received a great impetus. With this supply of wool at home has been built up a vast woolen manufacturing industry which has found it profitable to consume the kinds of wool American wool-growers have produced. Now, the pro-British party proposes to destroy alike the wool-growing industry and woolen manufactures. While the wool of other nations would displace American wools, manufactured goods bearing an *ad valorem* duty would be under-valued and admitted and sold at a price at first so low that the American mills would find it impossible to compete with English and German cheap goods. A restoration of the duties of 1867, and the adjustment of the duties on woolens upon a scale of absolute protection against foreign competition, is the kind of tariff revision which should be had.

LETTER OF DR. M. FRANK,

Manager Textile Colorist, 506 Arch Street, Philadelphia, Pa.

First. Wool-growing in America is, in my opinion, an industry most decidedly essential to our national prosperity from various reasons, of which I would present only a few: *a.* If the production of wool is considered as the principal object of sheep-husbandry, the growing demand of the textile industry is a powerful lever to increase the wool-growing industry as long as it finds a market not stocked by foreign wools. The more sheep are raised for their wool, the cheaper will become their meat, and the more abundant the supply of the meat markets, as well as of the morocco and kid manufactures, which in Philadelphia, at least, constitute a very important industry that depends almost entirely upon the supply of skins from the country and from the butchers respectively. *b.* With the present condition of sheep-husbandry in the United States and Territories, the domestic supply of wool is inadequate to requirements of our woolen mills, which are for the greatest portion of their raw material dependent upon importation from abroad, and upon the manipulation of foreign markets whose constant productions under the influence of ever changing political conditions and disturbances very materially react upon the prosperity of our manufacturing establishments. At this very moment there is a considerable rising of prices in the foreign wool market which could not have been foreseen three months ago, and which cannot fail to affect the manufacture of woolens in this country. A steady supply of the raw material is essential for the prosperity of the woolen industry, and can only endure by the home production of the raw material. If, therefore, the prosperity of manufactories which give employment directly and indirectly through their accessories, as machine building, &c., to millions of people, and cheapness of an important article of food for the people are elements of national prosperity, wool-growing in these United States and Territories is as essential to the prosperity as the raising of grain or cotton.

Second. I do not know of any branch of the farming industry which was more generally and evenly distributed, taking into account climatic conditions and confirmation of land in 1880, in the States and Territories, than wool-growing.

Third. The decrease of the number of sheep in the States since January 1, 1883, is evidently attributable to unprofitableness of sheep-breeding, which was caused by: *a.* Undue discrimination between worsted and woolen fabrics, admitting the former as at a lower rate of custom duties than the latter, which is no longer justifiable, since worsted goods are made of the best of any fleece of the finest wool. *b.* Disproportion between the rates of custom duties on woolen goods and manufactured wool, in favor of the former. *c.* Insufficiency of the duties on certain grades of imported wools, which discourages the growing of such wools.

Fourth. There can no reasonable doubt be entertained that the United States and Territories can produce all the wool needed for home consumption, not only in quantity, but in quality as well. In the vast extent of our country all the various climes and formation of soil are encompassed, which are the conditions of the characteristics of the products of other wool-growing countries. From the slopes of the Pacific coast, through the valleys of the Rocky Mountains, plains of the South and the prairies of the West, to the Atlantic coast and the northern climate and vegetation of the New England States, farmers have at their command all the essential conditions of sheep-breeding, from the highest to the lowest grade, and the low grades could probably be raised more profitably in this country, under proper protection, on account of their cleaner pastures giving less loss in weight by burs, &c., than the imported coarse wools, which are full of impurities even when washed. As regards prices compensating the grower, they depend upon the tariff, whether it equalizes the cost of home production and manufacture with the price of the foreign goods, or admits the latter cheaper than the same does of goods that can be produced or manufactured in this country. As regards the consumer, I believe it to be a generally accepted fact that the movements of one great established industry reflect upon all other industries of the country. Advance or depression in the one has advance or depression in the others for its sequel. If, therefore, by a high equalizing tariff the cost of imported products and fabrics is enhanced so as to allow the home producer and manufacturer to pay higher wages to the workingmen, the purchasing power of the working classes is proportionally increased, and the money earned and spent by them is kept in the country instead of being sent abroad for foreign cheaper goods.

Fifth. If wool is put on the free list, the grower will be ruined; instead of increasing his flocks he will reduce them. He would no longer care for high-grade wool-bearing sheep, but only raise heavy and bulky animals for the slaughter-house. Domestic wool would fall to the lowest standard in price and quality. By his diminished purchasing power, the manufacturer will lose a customer for high-priced manufactures. The seeming gain by the free wool of the manufacturer will be illusory. * * *

In the second place, the manufacturer loses a customer for high-grade goods if the grower is impoverished by "free wool." Third, by putting wool on the free list, the base for calculation of *ad valorem* duties is taken away, while it has been clearly demonstrated that the specification of duties on woolen goods (always including worsted) is an impossibility. Fourth, the demand of "free wool" is a stratagem of doctrinarians and satellites of the English Cobden Club to divide the interests of wool-growers and manufacturers, which are united under a protective tariff. Fifth, to put wool on the free list is the initiatory step towards the introduction of free trade for the relief of the British industry, which is ruined by the free-trade-policy experiment of twenty-five years, by surrendering the home market for domestic manufacturers into the hands of importers and agents of manufacturers of cheap-labor foreign goods, involving the decay of growing American industry, the introduction of pauperism among now well-paid workmen, and the impoverishment of the country generally by the necessarily consequent drain of our own hard money towards foreign countries. Sixth, "free wool" is the clamor of mere theorists, who have no interest whatever in manufacturing, nor any idea of the necessarily retrogressive influence upon the industry in practice, and of a few unsuccessful manufacturers, who, under all conditions, would be unable to compete with others on equal terms, but hope to momentarily better their circumstances by "free wool" at the cost of the growers' industry, which is as much entitled to protection as the manufacturers'.

Sixth. (Answered under second and third.) If wool-growing should gradually die out, the number of sheep raised for the meat would probably be diminished so as to force a rise in the price of meat and of the skins, and if the number of sheep raised for the meat should be increased, while wool-growing ceases, the wool from the skins of slaughtered animals would, by its greater quantity. never replace the loss in quality. On the other hand, as stated under question four, the properly protected sheep husbandry of the States and Territories would doubtless be able to supply, if not all, at least the greater portion of, the wool demanded for the equitably protected industry.

Seventh. The competition of domestic against imported wool in the home markets would entirely cease, as impossible under the "free wool" policy, from the reasons above stated.

Eighth. Is beyond the scope of my practical experience and observation.

Ninth. Both suffer alike from the reserve in buying material and working it up, necessitated by the agitation of the wool-tariff question; but the manufacturer suffers rather more, because the grower keeps his product on hand until the question will be settled, while the manufacturer, prudently refraining from production beyond the limit of actual orders, will have little stock to supply revived demand.

LETTER OF G. H. WALLACE,

President Missouri Wool-Growers' Association, Fayette, Mo.

[Mr. Wallace is a practical wool-grower.]

First. Common sense teaches that the prosperity of any country, and especially an agricultural one, depends upon diversity of interests, for thus there is less over-production or surplus, which is disastrous to the producer.

Second. The census for 1880 must answer.

Third. The inevitable result of market price of product being less than cost of production was a decrease in the number of sheep, amounting in Missouri since 1882 to nearly thirty per cent., the figures from the State Auditor's report being as follows: January 1, 1883, 1,542,514; January 1, 1886, 1,158,997, a decrease of over 383,000.

Fourth. Yes; if protected from foreign competition, both quality and quantity.

Fifth. Calamitous to both, as is demonstrated by the present disastrous condition. "Free wool" means destruction to the wool-growing interests, thus crippling the growers' power to purchase the manufacturers' product. If wool is free, the grower will demand a reduction of the tariff on woolens. This would necessitate a reduction in operatives' wages, against which they will fight, and, during it, the foreign manufacturer will take the market, an irreparable injury to our manufacturers, and when the reducton of wages is secured, the operatives' power of purchase of and diversity of demands for agricultural products would be greatly decreased; thus, a double blow is struck at the farmer.

Sixth. Facts and figures, which do *not* lie, prove that the interests of the wool growers, east, west, north, and south, have a common level, and you might as well undertake to bale one half of the ocean dry, without disturbing the other, as to destroy wool-growing in one section without ruining it in another. *Exposure, alkali, wild grapes, drought, sand, &c., will forever prevent the plains furnishing other than limited qualities of wool.*

Seventh. No; *and free grass is now at an end.*

Eighth. Lack of inducement for the investment of the capital and expenditure of the mental and physical labor necessary.

Ninth. The growers being greater in number, and "agitation" is used as a lever to break the wool market. Having less capital, they are obliged to realize, and cannot wait for prices to "steady." Their individual wants being few, information restricted, and means limited, they buy as necessities demand, not as opportunity offers.

We have received a fresh supply of letters in reply to circular, but time forbids inserting more in this report. The interrogatories are answered so fully that nothing is left us but to glean among the sheaves for a few straws here and there, and elsewhere than in the circular.

The magnitude of the industry of wool-growing in the world may be put as the product of 500,000,000 sheep. The United States stands fourth as to numbers, having, in 1883, 50,626,626, and yet we never have, in any one year, produced sufficient wool for home consumption.

In 1882 and 1883, before the present tariff act went into operation, we produced nearly all the wool required. The deficiency was less than 8,000,000 pounds. Since the passage of the present act, our sheep have diminished in all the States, and still continue to decrease in numbers. The annual clips from the States have also fallen off largely.

The importations of wool for the first nine months of the fiscal year of 1885 and 1886, present the enormous increase of 1886, (quoting the Treasury Department document No. 831.)

Much of this classified as carpet-wool is really clothing-wool.

	Quantities.		*Values.*	
Class.	*1885. Pounds.*	*1886. Pounds.*	*1885. Dollars.*	*1886. Dollars.*
Clothing, ...	6,686,501	29,802,303	1,307,910	5,122.240
Combing, ...	2,197,141	6,308,795	519,671	1,409,787
Carpet, ...	40,196,714	63,761,623	4,339,342	6,704,403
Total, ...	49,080,357	99,872.721	6.166,923	13,326,430

We also give statement of imports of woolen goods for March, 1885, and the corresponding month for 1886: March, 1886, $3,571,134; March, 1885, $2,599,087. This shows an increase of about fifty per cent. over that of March, 1885, which is nearly double that of the corresponding time last year. Two thirds of this wool should be raised in this country.

Since the act of 1883, wool went down in price far below the cost of production. The most careful analysis made by over one hundred practical wool-growers put the cost of producing a pound of wool at thirty-nine cents; to-day it drags in our market at twenty-six cents. In 1883, our flocks numbered 1,020,728. Mr. J. R. Dodge says the number engaged in the industry, including the flock-master, may be safely estimated at 2,000,000, and the capital invested amounts to $528,000,000.

If the tariff of 1883 was the leading cause to bring down the price of sheep and wool below the cost of production, where will the passage of the pending bill now before Congress place the wool-grower and his flocks, and those employed under him?

In the history of the tariff acts, without giving an abstract of each one, we had, up to 1824, no less than eighteen different acts putting wool on the free list. During the war of 1812, merino rams sold at one thousand dollars each. Wars are the same necessarily as a prohibitory tariff. At the close of the war, sheep had no protection; they went down in price, and one establishment had two thousand merinos killed for their pelts, their fleece not paying expense of keeping. The depression was so great and the price of wool so low up to 1824, when the first wool tariff was passed, business at once sprung up and prospered; new mills were erected, sheep increased in number and in price. In all we have had thirty tariff acts relative to wool. The history of these is, that when they were such as favored wool-growing, business prospered. Notably among these was the act of 1867. The acts from 1824 to that of 1834 were protective, from 1834 to 1842, the opposite up to 1847, when the tariff of 1846 went into operation. This was and is properly called the free trade tariff, and continued up to 1861; from 1861 up to the present time we have had protective. Of the disastrous effect of the free trade tariff of 1846 the wool industry was largely injured; under this tariff the fluctuations in the price of wool were more than under any other tariff; in fact, sometimes spasmodic, perhaps produced in part by the Mexican war. This act is also known as the "Walker tariff." "The Joint Report of the Wool-Growers and Wool Manufacturers to the Revenue Commission" says, "that every one of the 1,800 broad-cloth looms in the country ceased work."

Under the Walker tariff, from 1850 to 1860 the increase of wool is only fifteen per cent., but from 1870 to 1880, by the census, the increase is fifty-five per cent.; about four times more than under free trade.

Of all the wool tariff acts passed, none have been so satisfactory and acceptable to the wool-grower as the act of 1867. This was the only tariff act that fully protected the wool-grower. Six years before the passage of this act, the sheep of the United States numbered 22,471,225; in 1870, 28,477,951; in 1883, the number reach 50,626,626; in 1860, the wool clip was only 60,264,913 pounds; in 1870, it rose to 100,102,378 pounds; in 1883, it advanced to 320,400,000 pounds; but under the present act of March 3, 1883, the price of sheep and the demand has fallen. Our flocks have been reduced in the aggregate some 2,000,000 head.

In anticipation of the passage of the act of March 3, 1883, the enormous quantity of 26,978,660 pounds of foreign wool was stored in bonded warehouses in Boston and New York for lower rates of duty. Previous to the present act, wool brought forty cents a pound. The effect of this act and the continued tinkering with the tariff has so disturbed our wool markets, as I have before stated, as to make it a drag at twenty-five cents; a difference of fourteen cents a pound, and the loss of 300,000,000 pounds is $42,000,000. The territorial wools were less affected than the States. If we count the reduction of ten cents a pound for the national clip, the loss is $30,000,000 to the grower, while sheep have fallen off fully one third in value. Before the act of March, 1883, took effect in July following, our deficiency was 80,000,000 pounds, and if the act of 1867 had been let alone we would be producing 400,000,000 pounds, and we would not be paying twenty or thirty million dollars as we are now doing to a foreign people for what we can grow at home. There is no wool in the world equal to ours for lustre, elasticity, and strength of fibre. We might follow by illustrations of the blighting effects of free trade wool tariffs upon the wool-grower, but time forbids an extended review. In three years more this government will have completed one hundred years of its organized existence. During the ninety-six years already passed. it has had thirty-two years of free trade and sixty-four of protection, and we believe no one can successfully contest the assertion that the periods which make up the thirty-two years have been the ones of the greatest business prostration, and the eras which constitute the sixty-four years have been the times of the greatest prosperity." History shows prosperity until the suicidal compromise tariff of 1883 was passed. President Jackson said in his annual message of December 2, 1832: "Our country presents on every side marks of prosperity and happiness unequaled in any portion of the world." Compare with this era of prosperity the period from 1834 to 1842, and how great the contrast. Both government and people become poor, so poor that at one time President Tyler could not obtain his salary and had to borrow money of brokers. The tariff of 1842 brought relief. (See President Polk's message of 1846.)

One of the great hindrances to successful wool-growing is false classification, undervaluation at our custom-houses, and consignment of British goods to be sold for what they will bring in our large cities. Our wool tariff schedules provide for three classes only, but the grades and mixtures under these or outside of these required the Secretary of the Treasury to provide samples to meet the various kinds of wool and mixtures imported. Accordingly, George W. Pond was employed to make the samples to judge by, and found it necessary to provide no less than one hundred and sixty-eight. Even with this large number our customs laws are largely evaded, notwithstanding the honest effort of Secretary Manning to prevent fraud. Time forbids explanation. We conclude this report with the words of Henry C. Cary, who sums up the history of tariff legislation as follows: "Protection as established in 1813, 1828, 1842, gave us, as that of 1861 is giving, great demand for labor, wages high and money cheap, public and private property great beyond all previous precedent, growing national independence. But free trade, as established in 1817, 1834, 1846, and 1857 bequeath to its successor, labor everywhere seeking to be employed, wages low and money high, public and private revenues small and steadily decreasing, emigration declining, public and private bankruptcy universal, growing national dependence.

JOHN MCDOWELL, *Chairman*,
J. A. HERR,
M. W. OLIVER,
Members of Committee.

REPORT OF COMMITTEE ON FRUIT.

By G. HIESTER, *Chairman*, Harrisburg, Pa.

The Committee on Fruit and Fruit Culture respectfully present the following:

In the latter part of May, the chairman sent a number of queries to the different members of the committee, who are located in ten counties of the State, and represent almost every important agricultural section. From the answers returned to him it appears that throughout the entire State, the apple, pear, peach, plum, cherry, and quince trees and grape-vines passed the winter remarkably well, blossomed profusely, and have set a heavy crop of fruit. The only exceptions being, that in those localities where they had a heavy orop of apples last year, they have a very light one this year, and in a few isolated cases the peaches were hurt by the winter. But it appears this only occurrred in orchards not favorably located, and in sections where the peach, as a rule, does not do well. This was notably the case in Washington county, where the peach appears to be running out. The trees are becoming so short lived that growers have become discouraged, and do not consider it worth while to plant them any longer.

The cherry and plum trees look unusually well. The wet weather just after the blossoms had matured checked the ravages of the curculio, and allowed the crop to form almost entirely uninjured by this pest. As a result, we have the largest and finest crop of cherries for many years, and the plums promise to do about as well. While it is too early in the season to predict with any degree of certainty what the harvest of fall and winter fruits will be, as that will depend largely upon the weather later in the season, we can safely say that fruit trees and vines of all kinds never looked better than this season, and all give promise of an abundant harvest.

Blackberries, raspberries and, strawberries, both wild and cultivated, passed the winter uninjured, and although held back somewhat by the cool weather of May, are now maturing an extraordinary crop. The yield throughout the entire State is unprecedented, and the quality of the fruit has never been excelled.

Few cultivators grow currants and gooseberries to any extent, owing to the ravages of the currant worm on the former, and the mildew on the latter. The cost of growing either of them is greater than the profits, and those who had plantations a few years ago are now abandoning them.

Among the hundreds of new varieties of fruit that have been lately offered to the public for trial, there appear to be none that we can recommend as possessing all the good qualities claimed for them, and none that we can especially recommend for general cultivation on account of their superiority over old and well tried sorts, yet there are some that have proved real acquisitions to certain sections which appear to furnish just the conditions needed for their perfect development; among these we might mention Fay's prolific currant, Worden's grape, McDowell's seedling apple for jelly. We do not wish to discourage any one from planting a few of the latest acquisitions each year, as by so doing we can only discover what advances are being made in this direction, and what, if any, of the new varieties are especially adapted to our locality, but we would caution any one who contemplates planting an orchard against filling it up with high-priced, untried sorts, as this practice is sure to lead to disappointment, and has done much to retard and discourage fruit-growers in many places.

The interest in orcharding appears to have increased within the last five years in those sections rather remote from large cities, but near a line of railroad that affords easy access to the principal markets, while in the immediate vicinity of large cities orchards have ceased to pay, as the land is too valuable, and must be cultivated in such crops as will yield a sure return each year. In the matter of planting trees and vines, Juniata county appears to be taking the lead just now. The soil and climate are well adapted to the growth of winter apples, pears, grapes, and, in some parts, peaches and plums. They have a good market for these in the northern and western part of the State, and at the present rate of progress, Juniata county promises very soon to rival Dauphin, York, and Cumberland in the quantity, quality, and variety of her fruits. Some very fair orchards of apple, peach, and pear have lately been planted in Dauphin county, and the interest appears to be increasing each year. Those that have reached bearing age are, as a rule, quite profitable, and we see no reason why they could not continue to be so if proper care is exercised in the selection of varieties and location.

With a great deal of pleasure, we note the fact that the farmers of the State are each year taking more interest in the cultivation of fruit for use in their families, that as they become convinced of its healthfulness each year they are using less salt pork and more fruit. There is nothing that has a greater tendency to elevate, improve, and refine the tillers of the soil and their families than constant association with choice fruit and beautiful flowers. We consider this a matter of great importance, and would urge that it be made a special matter for discussion at the farmers' institutes, in those sections where the planting of fruit trees have been neglected up to this time. By means of these discussions, and the example of one or two men in a community, our choice fruits will very soon find their way into the home of every farmer of the State, taking with them health, enjoyment and content, making home attractive to children, affording variety and recreation to the tired mother, and giving to the farmer a sense of satisfaction and pleasure in his home that the mere acquisition of dollars cannot afford. Besides this, in the cultivation of fruit for the family, many farmers will discover that they have exactly the location suited to produce a particular variety in perfection, and be led to plant largely and make the cultivation profitable. On this depends, to a great extent, our success or failure in fruit-culture. We must grow just what our ground is suited for, and then we will be able to compete with others, no matter how favorably located. The most discouraging feature of the business is the fact that, owing to the improvements made in the carrying facilities of railroads, all the markets of the State are filled with fruit grown in the South long before our season commences, and, owing to the discrimination of freight and express companies in favor of southern shipping points, notably Baltimore, we are prevented from a fair competition with them in the more northern markets. This affects prices very seriously, in many cases running them down below the paying point, and the quantity of fruit brought in is annually increasing. This is a fact that fruit-growers must face, and must devise means to overcome.

In the opinion of your committee, we must grow only such varieties of fruits as are adapted to our particular sections; cultivate less acres and grow more to the acre; reduce the expenses of growing in every possible way; leave no means untried to improve the quality; and be more careful to put up our fruit for sale in the most attractive form, so as to command the highest price the market affords, and thus we may be able to compete with the cheap Southern article.

We must open our eyes to the fact that fruit is no longer a luxury, but is rapidly becoming a necessity, not only to the wealthy, but to the laboring man as well, and while the time of high prices is past, each year the demand for good fruits at reasonable prices will increase, and when the working-men all over the land regard it as a necessity, the demand will be practically unlimited.

When all these things are considered, and when we remember the depression that has lately existed in all branches of trade, we are forced to the conclusion that the outlook for the fruit-grower of Pennsylvania is about as favorable as any other industry.

Respectfully submitted.

GABRIEL HIESTER, *Chairman*,
M. W. OLIVER,
J. A. HERR,
N. F. UNDERWOOD,
ISRAEL GARRETSON,
J. McDOWELL.

REPORT OF COMMITTEE ON CEREAL CROPS.

By J. A. HERR, *Chairman*, *Cedar Springs*, *Pa.*

The vast importance of this, the primal agricultural industry, its magnitude and diversity, makes it impracticable to undertake to treat of the whole subject in one brief report. We will, therefore, confine this *first* report to the consideration and investigation of a few items relative to the wheat and corn product, and incidentally to oats and barley.

With a view to drawing out a few facts relative to this subject, I addressed to each member of the committee the following questions, viz:

1. What was the acreage of the wheat crop (harvest of 1886) in your locality compared with crops of past five years?
2. What is the yield per acre compared with past five years?
3. How will the present seeding (fall of 1886) compare in extent with last year?
4. Is the growing of rye and barley on the increase—to what extent and why?
5. Which of the cereals is most profitable in your section?
6. What is the average price of wheat (October 1) in your section?
7. What is the cost per bushel of raising wheat in your section?
8. What varieties of wheat are most successfully and profitably grown in your section?
9. What varieties of wheat are most in demand for milling qualities, and what extra prices do they bring?
10. What are the greatest hindrances to profitable wheat-growing in this State? Suggest remedies.

Several of these questions might be more accurately answered by referring to the reports of the Department of Agriculture, but we preferred to have them in addition to those reports, that we might give sectional reports.

Answers were received from nearly all of the members of the committee, a condensed report of which we give:

1. The acreage of wheat crop in the eastern and central part of the State comes up to the average of the past five years. The western and northern varies from ninety to ninety-five per cent. The yield per acre is more varying, running from sixty-five to one hundred and twelve per cent., while in single counties (notably Centre) the average yield will probably not be more than twenty-five per cent. Erie county reports sixty-five per cent.; Crawford, one hundred and twelve per cent.; Union, ninety-five per cent.; Berks, ninety-seven per cent.; Sullivan, one hundred per cent.; and Washington a reduction, and Jefferson ninety per cent., showing on an average a slight reduction. Where the loss is great, it is attributable largely to the ravages of the Hessian fly and a severe winter.

2. Notwithstanding the various drawbacks to wheat-growing, the seeding of this fall promises to be great as usual, except in a few localities. This, we think will, be accounted for by the increasing use of commercial fertilizers, enabling farmers to increase their acreage of all cereals.

3. The present low prices paid for wheat has had a tendency to stimulate the growing of other cereals. Rye is not far behind in price, and on light soils will produce a more profitable crop than wheat, the fact of its standing the winter so much better being greatly in its favor. Its great objection seems to be that it is difficult to keep it from getting mixed with the wheat when grown on the same farm. It is also valuable for early soiling.

4. Barley is on the increase in a few localities. Erie county reports twenty per cent. increase. On good soil producing from thirty to fifty bushels per acre, at a valuation of sixty cents per bushel, it is more remunerative than wheat, coming into market sooner and being less exhaustive to the soil.

5. The answer to the fifth question varies with localities. The majority, however, state that corn is the most profitable crop. Erie county gives barley, Union and Sullivan counties oats, as the most profitable, and not one says wheat.

6. The present price of wheat in the different parts of the State varies from seventy-five to ninety cents, owing apparently to the facilities for reaching a market and the fact of competition in carrying companies.

7. The cost of raising a bushel of wheat is reported as varying from seventy-five cents to one dollar per bushel on an average crop of fourteen to twenty bushels per acre.

8. The varieties of wheat most successfully and profitably grown are given, as follows: Union county reports Shumaker wheat; Erie says, "Gold Drop," Clawson, Fultz, and Martin Amber; Washington, Jefferson, Berks, and some other counties, say Fultz; Crawford grows the "Lancaster," "Democrat," and Michigan White; and other counties recommend "Lancaster," Martin Amber, and Shumaker.

9. Answers to the ninth question bring out the fact sought for, that there is but very little difference in the prices of the different varieties on account of their milling qualities. The "Lancaster Red" and other long-berry wheats are in most demand. The extra prices paid for them in no case is reported to exceed five cents per bushel, and in most cases there is made no difference. This fact virtually settles the case as to the variety of wheat grown, for the farmer will certainly grow the varieties that produce the best yield per acre in his locality. Taking the entire State, there seems to be no one variety that so generally succeeds as the Fultz.

10. The hindrances to profitable wheat-culture are given, as follows: "Imperfect cultivation," "extreme cold weather," "low prices of grain and high prices of fertilizers," "high price of labor," "poor quality of soil," "competition with cheap lands of the West," "discrimination in railroad freights," &c. Remedies suggested are: "More thorough cultivation and fertilization," "education and organization," to regulate our products, protect ourselves from imposition, illegal demands, discriminations against our interests, failure to enforce our laws relative to discriminations by common carriers, and "protect our industry by sufficient tariff." In short, let *Pennsylvania* take care of *herself*, so that she is not impoverished and other States enriched at her expense.

These remedies, though specially applicable to the profitable growing of wheat, apply to all our products to a greater or less extent, and, coming from all sections of the State, point to a line of duty which we cannot afford to neglect. As a grain-growing State, we are not keeping pace with our Western sisters.

Statistics from the reports of the Department of Agriculture show that in 1880 Pennsylvania produced twenty-two million one hundred and fourteen thousand three hundred and eighty bushels of wheat, while in 1884 she produced but twenty million eight hundred and twenty thousand bushels, ranking in 1880 as ninth ,and in 1884 as twelfth wheat, producing State in the Union. In raising corn, a marked decrease is reported. In 1880, Pennsylvania produced fifty-five million eight hundred and four thousand seven hundred bushels of corn, while in 1884 but forty-three million four hundred and sixty-six thousand were produced, ranking in 1880 as tenth, and 1884 as eleventh, corn-producing State. Meanwhile, the acreage both of wheat and corn were increased, showing an average yield in 1880 of wheat fifteen bushels per acre, in 1884 of thirteen and six tenths bushels per acre; of corn in 1880, forty and six tenths bushels per acre, and in 1884 of but thirty-two bushels per acre.

A comparison of prices for the same years is as follows: In 1880, wheat averaged one dollar and nine cents, in 1884, eighty-six cents per bushel; in 1880, corn averaged fifty-three cents, and in 1884, fifty-two cents per bushel. A comparison with prices in 1886 would show a still further reduction. These showings forcibly argue a policy of less acreage and more thorough tillage and fertilization.

We deduce from the foregoing statement that wheat is not grown with profit in a major portion of this State. That it is only by close management and by reckoning a low rate of interest on land that it is grown without actual loss. That farmers, to be successful, must turn their attention to growing more corn and coarse grains, and to a greater variety in farming. With the introduction of new varieties of wheat that will increase the yield, and an intelligent system of fertilizing, together with greatly reduced prices of agricultural implements, we are not without hope that wheat may yet be grown with profit in Pennsylvania.

The question of maintaining the fertility of the soil while growing wheat is continually becoming more of a study. The new lands of the State seem to possess the essential properties to grow wheat successfully, both in quality and quantity; but, as they grow older, some of these elements become exhausted, and the farmer is puzzled to ascertain just what is needed to keep up the fertility of his soil, at an expense that will allow of his keeping up the acreage of his products; and it is only by continued and intelligent effort that this knowledge is obtained. Meanwhile, the average farmer will fare best by reducing his acres and applying more fertilizer.

The cheapest way of maintaining the fertility of our soils in a large portion of the State is to grow more grass for pasturage and hay, and to raise sufficient stock to consume it, thereby increasing the "farmers gold mine," (the manure pile,) and in turn enriching the fewer acres which will be used for wheat. Then, finally, let us turn our united attention to the correction of abuses in discriminating against us by our public carriers, so that while they obtain their franchises from us as a State, they give us an equal chance with other States in the marketing of our produce, instead of reducing the value of our lands and produce by taxing us exorbitant and discriminating rates in favor of other States and other markets. We also protest against a discrimination in favor of the rich against the poor—in favor of a monopoly against an individual—a discrimination that will allow a dealer who ships large quantities better rates than a person who ships a single carload, thereby favoring the grain-dealers and speculators to the disadvantage of the farmer.

We believe, with the correction of these abuses, the State of Pennsylvania will still be able to successfully compete with the other States in the Union in the production of all our cereals.

REPORT OF THE COMMITTEE ON GRASSES AND FODDERS.

By N. F. UNDERWOOD, *Chairman*, *Lake Como*, *Pa.*

Among the subjects of inquiry during the year, the results of which we attempt to give in this report, are the following:

1. The product and value of hay, and condition of pasturage, for present season.
2. The tendency to devote an increased percentage of the farms to grass crops, or otherwise.
3. Is there a tendency among the farmers of our State to sow a greater variety of grasses than formerly, for hay or pasture, and if so, what additional kinds are now sown; also, what other crops are mostly grown as substitutes for or to supplement the grass crop?
4. Whether there is a tendency among our farmers toward a more general adoption of the soiling system.
5. To what extent straw is used as food for stock.
6. To what extent is ensilage used, and is its use increasing or decreasing?

The hay crop of 1886 has varied greatly in different portions of the State, but, taking all the reports received, we think it may be set down as fully up to, or perhaps a little above, the usual average for the entire State. From some north-western counties the reports are as low as seventy-five per cent. of an average yield, while some south-eastern and central counties report as high as one hundred and twenty per cent. The product in the north-eastern section may be set down as fully one hundred per cent., varying somewhat in the several counties of that section.

The reports of the present value of hay per ton range from eight to twelve dollars, but a large majority of all the reports received place the value at ten dollars per ton, which is about the general average for a term of years for nearly all localities.

From the reports received, it would seem that the average condition of grazing lands has fallen below the hay product, owing to the fact that the months of July, August, and early September were quite generally dry. Local exceptions are reported where good feed in pastures continued until late in September, but, as a rule, in most sections, July and August were months of drought. Rains in September have improved the condition of pastures in most localities, while from a few come reports of present dryness.

Inquiries concerning a tendency to increase the area of grass lands have shown that there is such a tendency, especially in localities most favorable to grass production. Mr. J. C. Thornton, of Erie county, says: "A great tendency towards more grass, and not so much to cereal crops." Mr. F. R. Miller, of Warren county, says: "As our farmers cannot compete with the West in raising cheap grain, (especially wheat,) they are devoting more of their land to grass crops." Mr. John McDowell, of Washington county, says: "At present there is a tendency to devote more land to grass crops." Mr. J. A. Herr, of Clinton county, says: "Probably an increase of five per cent." In the drift-covered north-eastern counties, where it may almost be said "once in grass, always in grass," and where all other crops and all cultivation are regarded only as a means to increased grass production, it may be said that grass is certainly not losing its grip upon the soil. In the south-eastern counties the reports indicate no noticeable change.

As to a tendency to cultivate a greater variety of grasses, for hay or pasture, than formerly, the reports received show that experiments in this direction have been confined to a few individuals. It is encouraging to note that even a few are attempting something in a field which seems to promise such good results. Mr. J. C. Thornton, above quoted, says, concerning this: "I have for several years been sowing twelve to sixteen different grasses and clovers, and recommend the following: Common red, Alsike, White Dutch, and Pea-vine clovers, English and Italian rye-grass, meadow and sheeps' fescue, timothy, red-top, orchard grass, blue grass, sweet vernal, meadow fox-tail, and tall oat-grass. Have sown from twenty to thirty pounds of this mixture per acre, and my seeding has covered the ground, and my pastures are of good quality. Others are trying it, and are well pleased with the result." Others report some few experiments, but are of the opinion that ninety-nine per cent. of all the grass seed sown is timothy and clover. Still others say: "If there is any change, it is too small to notice."

Of the crops grown as substitutes for, or to supplement, the grass crop, sowed corn is manifestly the main dependence. Hungarian grass and millet are grown to some extent, yet, taken all together, the cultivation of these crops is not so general as it might be, and as it ought to be, considering the oft-recurring droughts which cut short both our summer and winter supply of stock food.

In connection with this subject, the suggestions of Mr. John McDowell, member of this Board, and of this committee, are well worthy of consideration. He says: "It seems to me that this subject is a very important one, and to me it presents another view that deserves notice. I refer to the noxious weeds that root out our pasture grasses, such as ragweed, yarrow, plantain, daisy, sheep-sorrel, dandelion, thistle, mullein, wild-carrot, and multitudes of others. The two greatest pests in our section are plantain and sheep-sorrel. The question is, how can we banish them and others?" Everywhere in our State these pests are present, sometimes in mowing lands, but more persistently in fields used as permanent pastures. A few of them thrive only in favorable localities, but most of them adapt themselves to a wide range, and flourish in all soils and situations. How large a percentage of our grazing fields they occupy cannot be stated with certainty, yet we cannot doubt it is at least twenty-five per cent., and more likely in many localities fifty per cent. of the entire surface. Surely, this question is one demanding serious consideration, and worthy of special inquiry and investigation by the members of this Board, and he who can point out a practicable plan for making grass grow where only weeds now occupy the ground, will indeed be a public benefactor.

Our inquiries concerning a tendency to more generally adopt the soiling system, result in evidence that there is little or no increased tendency in that direction. The reasons assigned are that land is too cheap, and labor too dear, to make it profitable to our farmers. May it not also be that the adoption of that system would require a greater degree of thoroughness and a more constant attention to details than most of our farmers are willing to bestow, however beneficial such change might promise to be? Without expressing an opinion, we leave the question for each individual stock-owner to ponder for himself.

As to the use of straw, we learn that probably three fourths of it still goes directly into the manure pile, about one fourth only being utilized as stock-food. It seems unnecessary to here refer to its feeding value, so frequently determined by both practical and scientific tests, and we are forced to the conclusion that our farmers have yet much to learn in the matter of farm economy, or that they are so generally prosperous that there is no especial need of their turning all their resources to account.

Concerning ensilage, the reports received show that in the localities heard from it is used but little, or not at all, and that its use is not increasing. In view of these facts, we cannot escape the conclusion that those who so strongly advocated its use, a few years ago, greatly overrated its value as a substitute for the ordinary stock-foods.

We present, as a part of this report, a list of Pennsylvania grasses, embracing, as is believed, nearly all the species found in the State. For this list the committee is indebted to Mr. Warren R. Shelmire, of Avondale, Chester county, a member of this committee.

GRASSES OF PENNSYLVANIA.

By W. R. SHELMIRE, *Avondale, Chester county.*

The following list embraces nearly all the species found within the limits of the State. They are mostly of scientific interest only, but many of them are extensively cultivated for hay and pasture, as timothy, green grass, Hungarian, &c. Many are considered vile weeds, as couch grass, (*Triticum repens*,) burr grass, (*Cenchrus tribuloides*,) cheat or chess, &c. The family includes the grains, (wheat, corn, &c.,) broom corn, sorghum, bamboo, sugar cane, etc., etc. We find the grasses, in their various species, adapted to all varieties of soil, and to all extremes of temperature and moisture, and a more thorough acquaintance with their properties and habits would enable the agriculturist to use his land to better advantage. The arrangement here followed is that of Prof. Asa Gray. The generic name is given in first column, followed by the name of the species, the common name, if any, where found, and if an exotic the fact is mentioned.

Leersia orysoides—Wild Rice; swamp and margins of rivulets.
Leersia virginica—Moist woods.
Zizania aquatica—Water Oats; Indian Rice; along tide-water.
Alopecurus pratensis—Meadow Foxtail; blossoms in May, and must not be confounded with our common Foxtail of the fall and summer months, which it much resembles. From Europe.
Phleum pratense — Timothy, Huerd's Grass; well known; cultivated grass. From Europe.
Vilfa vaginæflora—Barren and sandy, dry fields, road-sides, &c.
Sporobolus junceus—Drop Seed Grass; dry soil.
Sporobolus heterolipis—Drop Seed Grass; dry soil.
Agrostis perennans—Bent Grass; dry, open woods.
Agrostis scabra—Hair Grass; serpentine ridges.
Agrostis vulgaris — Red Top, Huerd's Grass; moist meadows and pastures. From Europe. Formerly cultivated to some extent, and thus naturalized.
Agrostis alba—Florin, White Bent Grass; meadows and fields. From Europe.
Cinna arundinacea—Reed like *Cinna;* moist woods and thickets.
Muhlenbergia sobolifera — Drop Seed Grass; open, rocky woods.
Muhlenbergia glomeratia — Drop Seed grass; slaty hills.
Muhlenbergia Mexicana — Drop Seed Grass; low grounds.
Muhlenbergia sylvatica — Drop Seed Grass; low and rocky woods.
Muhlenbergia Willdenovii — Drop Seed Grass; rocky woods.
Muhlenbergia diffusa—Drop Seed Nimble Will; dry, shady hills and woods, yards, orchards, &c.; very common.
Brachyelytrum aristatum—Rocky woods.
Calamagrostis confinis — Reed Bent Grass; swamps.
Calamagrostis nuttaliana—Moist ground.
Calamagrostis Porteri—Dry woods and rocks.
Calamagrostis stipeæ—(*Flora Cestrica.*)
Stipa avenacea—Black Oat Grass; dry, sandy woods.
Aristida dichotoma—Poverty Grass; dry, sandy or gravelly fields.
Aristida gracilis—Triple Awned Grass; sterile, sandy, or gravelly fields.
Aristida pupurascens — Triple Awned Grass; sterile soil. The *aristidas* are remarkably worthless to the farmer.
Spartina cynosuroides — Fresh Water Cord Grass; banks of rivers and lakes.
Spartina stricta—Salt Marsh Grass; salt marshes.
Bouteloua curtipendula — Serpentine rocks and hills.
Gymnopogon racemosus—Naked Beard Grass; sandy pine barrens.
Cynodon dactylon—Bermuda or Scutch Grass; troublesome in light soil.
Eleusine Indica—Dog's Tail, Crab, Yard, or Wire Grass; extensively naturalized from Europe; very troublesome in yards.
Tricuspis sesleroides—Tall Red Top; dry, sandy fields, banks, road-sides, &c.
Diarrhena Americana — Shaded river banks and woods.
Dactylis glomeratia—Orchard Grass; introduced from Europe and extensively cultivated.
Koeleria cristata—Dry hills.
Eatonia obtusata—Dry soil.
Eatonia Pennsylvanica—Dry soil, road-sides, &c.
Melica mutica—Melic Grass; rich soil.
Glyceria Canadensis—Rattlesnake Grass; Bogs and wet places.
Glyceria obtusa—Manna Grass; bogs.
Glyceria nervata—Fowl Meadow Grass; moist meadows.
Glyceria fluitans—Manna Grass; shallow water.
Glyceria acutiflora—Manna Grass; wet places; rare.
Poa annna—Low Spear Grass; cultivated and waste rich grounds. From Europe.
Poa compressa—Wire Grass; dry soil and waste places. From Europe.
Poa serotina — False Red Top, Fowl Meadow Grass; wet meadows and low banks. A good grass for moist meadows. From Europe.
Poa pratensis—Green or Common Meadow Grass, Kentucky Blue Grass; meadows and pastures. Extensively cultivated. From Europe and probably indigenous.
Poa trivialis—Roughish Meadow Grass; moist meadows. From Europe.
Poa sylvestris—Rocky woods.
Poa alsodes—Woods on hill-sides.
Poa brevifolia—Rocky or hilly woodlands.
Eragrostis poæoides—Sandy waste places, gardens, road-sides, &c. From Europe.
Eragrostis pilosa — Hairy *Eragrostis;* sandy waste places. From Europe.
Eragrostis Frankii—Low, sandy ground.
Eragrostis Purshii—Sandy, or sterile, open ground.
Eragrostis capillaris—Sandy soil, slaty hills.
Eragrostis pectinacea—Sandy, dry ground.
Festuca myurus—Dry fields. From Europe.
Festuca tenella—Little Fescue, dry sterile soil.
Festuca ovina—Sheep's Fescue; naturalized from Europe as a pasture grass.
Festuca elatoir—Taller or Meadow Fescue; rich grass land. From Europe. Occurs abundantly in most pastures.
Festuca nutans—Nodding Fescue; rocky woods and copses.
Bromus secalinus—Cheat or Chess; grain fields and pastures. Well known weed from Europe.
Bromus racemosis—Upright Chess, nearly resembling the last. From Europe.
Bromus mollis—Soft Chess; wheat fields. Not so common. From Europe.
Bromus ciliatus—River banks and moist woodlands.
Bromus sterilis—Waste places and river banks. Not common.

Uniola latifolia—Spike Grass; shaded, rich hill-sides.

Phragmites communis—Reed; edges of ponds and streams. Resembles broom-corn at a distance. From Europe.

Lolium perenne—Darnel Rye or Ray Grass; good pasture land, meadows, and lots. From Europe.

Lolium temulentum—Bearded Darnel; grain fields; rare. Grain noxious, almost the only instance known among grasses. From Europe.

Triticum vulgare—Common Wheat; native country uncertain.

Tripicum repens—Couch, Quitch, or Quick Grass; very troublesome in pastures and cultivated fields.

Hordeum vulgare—Four-Rowed Barley; cultivated from Sicily and Tartary.

Hordeum distichum—Two-Rowed Barley. From Tartary.

Secale cereale—Common Rye. From Europe and the East.

Elymus Virginicus—Wild Rye, Lime Grass; river banks.

Elymus Conadensis—River banks.

Elymus striatus—Rocky woods and banks.

Gymnostichum Hystrix—Bottle Brush Grass; moist woodlands.

Danthonia spicata—Wild Oat Grass; dry and sterile or rocky soil.

Avena sativa—Common Oats; native country unknown.

Avena striata—Wild Oats; rocky, shaded hills.

Trisetum subspicatum—Mountains and rocky river banks. From Europe.

Trisetum palustre—Low grounds.

Aira flexuosa—Common Hair Grass; dry places. From Europe.

Aira cæspitosa—Shores of lakes and streams. From Europe.

Arrhenatherum avenaceum—Tall Oat Grass; meadows and lots. From Europe.

Holcus lanatus—Velvet Grass, Feather Grass, White Timothy; moist meadows. From Europe.

Anthoxanthum odoratum—Sweet Vernal Grass; meadows, pastures, &c. From Europe.

Phalaris canariensis—Canary Grass; waste places and road-sides; rare. From Europe.

Phalaris arundinacea—Reed Canary Grass; wet ground; border of streams. From Europe. The common Ribbon grass of the garden is a variety (*picta*) of this grass.

Mileum effusum—Millet grass; cold and damp woods.

Paspalum setaceum—Sandy fields and road-sides.

Paspalum læve—Moist soil and grassy flats.

Panicum filiforme—Dry, sandy soil.

Panicum glabrum—Cultivated grounds and waste places. From Europe.

Panicum sanguinale—Common Crab or Finger Grass; cultivated and waste grounds. From Europe.

Panicum anceps—Wet, sandy soil.

Panicum agrostoides—Wet meadows; borders of swamps, &c.

Panicum proliferum—Wet meadows and road-sides.

Panicum capillare—Old Witch Grass; Sandy grounds, corn fields, &c.

Panicum virgatum—Moist sandy soil.

Panicum amarum—Sandy shores.

Panicum latifolium—Moist thickets, &c.

Panicum clandestinum—Low thickets and river banks.

Panicum xanthophysum—Dry, sandy soil; rare.

Panicum microcarpon—Damp soil and low grounds.

Panicum pauciflorum—Wet meadows and copses.

Panicum dischotomum—Dry or low grounds.

Panicum depauperatum—Dry woods and hills.

Panicum Crus-galli—Barnyard Grass; moist places, chiefly manured soil, barnyard drains, &c. From Europe.

Setaria verticillata—Bristly Foxtail; gardens and lots; not common. From Europe.

Setaria glauca—Foxtail; very common on stubble. From Europe.

Setaria viridis—Green Foxtail, Bottle Grass; cultivated grounds. From Europe.

Sstaria Italica—Millet or Bengal Grass, Hungarian Grass. Cultivated from Europe.

Cenchrus tribuloides—Hedge-Hog or Burr Grass; sandy soil and old fields. A vile weed.

Zea mays—Common Indian corn. Native of South America.

Tripsacum dactyloides—Gama or Sesame Grass; at one time cultivated. A remarkable grass; leaves broad like those of Indian corn.

Erianthus alopecuroides—Woolly Beard Grass; wet pine barrens. The ornamental *E. ravennae* belongs to this genus.

Andropogon furcatus—Beard Grass; common in stubble soil.

Andropogon scoparius—Beard Grass; sterile banks, old fields, &c.

Andropogon Virginicus—Beard Grass; sandy, sterile soil.

Andropogon macrourus—Beard Grass; low and sandy ground.

Sorghum nutans—Indian Grass, Wood Grass; dry soil.

Sorghum vulgare—Common Sorghum, Indian Millet. Introduced from India and China.

Sorghum saccharatum—Broom Corn. From India.

Sorghum cernuum—Drooping Sorghum Guinea Corn; fields and gardens. From India.

NOTE.—The list thus embraces fifty-six genera and one hundred and thirty-two species. The ornamental grasses of the gardens are not included.

TAXATION AS IT AFFECTS THE DIFFERENT INDUSTRIES.

By Hon. H. N. WILLIAMS, *of Towanda, Pa.*

[Read at the summer meeting.]

Governments are established and maintained for the protection of the people, within their several jurisdictions, in their public and private rights.

This protection should extend and reach all the inhabitants equally and alike whatever may be the condition, situation, and pursuit of the individual member of the government, and wherever and whenever this is not done, injustice is done to the governed. Organized governments protecting the industries and accumulations of the people is the foundation stone of the progress and advancement of mankind to his present civilized educated, and enlightened condition.

Governments create burdens as well as bestow benefits upon the governed. Large sums of money are required to bear the expenses, and carry forward the various departments and divisions of the governments to the end that the rights of the citizen in his individual capacity shall be secured, and that his highest good, and social and intellectual advancement attained.

This vast sum of money must be obtained from the people governed; those receiving the benefits must bear the burdens incident thereto. These burdens should be equally and justly imposed on all persons and property, without reference to kind or ownership, and all alike pay its just and proper ratio of taxation.

Our discussion is limited to Pennsylvania, and her departments and divisions of government and methods of taxation will be considered only; and in doing so, we shall designate the several departments and divisions of the State government, and the costs of conducting them. Then designate the various kinds of property owned by the people of the State; how it is at present taxed, and for what purposes the money is used, and lastly, consider their effect upon the industries of the State. In fixing the expenses of the several departments and divisions of the government, accuracy can be attained only in those, and the others will have to be estimated and approximated. Only three of the several divisions of the State have responsible heads making reports to the people. These are the State government, covered by the Auditor General's report; the school, covered by the report of Superintendent of Public Instruction; the affairs of the several counties of the State, found in the report of the Secretary of Internal Affairs.

The State government, with its legislative, executive, and judicial departments, the payment of the interest on, and the reduction of, the public debt, and appropriations for the public schools and charities, requires the sum of $6,226,959 38.

The aggregate county taxes imposed and collected in the State, to maintain the county government, with expenses, amounts to the sum of $15,544,520 27.

The support of the public schools costs $9,463,221 81; but as one million is paid by the State, there is to be raised in the school-districts, $8,463,221 81.

Here statistics end, and there are no means of accurately getting at expenses of towns, cities, boroughs, and poor-districts, as it is impossible to refer to the records of all these divisions of the government of the State. From the sum raised for county purposes, and with some knowledge of rates of taxation, it is safe to say city, town, and borough taxes exceed that of the counties, and it is not too high to put the figures for these purposes to $15,500,000.

The aggregate poor tax needed to care for the unfortunate is very large. The poor we always have with us, and they must be cared for, and the sum required is not less than $3,000,000.

Thus we find that the aggregate costs of the government of the people of the State of Pennsylvania amounts to the enormous sum of $48,634,700 56, and will undoubtedly reach the sum of $50,000,000.

Our next proposition is to designate the various kinds and classes of property within the State that ought to share these burdens, and state how it is now taxed.

We will begin with corporation property.

The report of the Secretary of Internal Affairs shows that the paid-up capital stock of all the railroad companies of the State is $699,049,767. The same report shows that the bonded debt of these companies is $653,447,689, a total of $1,352,797,456. The cost of construction and equipment of these roads amounts to $900,000,000, with a large ownership by many railroad corporations of mineral lands, wharves, store houses, and steamship lines; therefore, it is safe to say the railroad property of the State alone reaches $1,000,000,000.

The paid-up stock of the passenger railroad companies of the State is fixed by the same authority at $26,943,663; canal property at $50,000,000; telephone property at $10,000,000; telegraph property, $54,000,000. The report of the Secretary of State to the Legislature gives the stock of the corporations organized under the act of 1874 at the sum of $450,000,000.

The other corporations organized under the act of 1784, and under prior laws, will reach the sum of $150,000,000.

The Insurance Department shows the capital of fire insurance corporations of the State to be $54,576,100, with a surplus of $36,945,610, and the life insurance capital to be over $60,000,000.

Limited partnerships, which are taxed the same as corporations, will reach $50,000,000.

These sums make the corporate property and franchise of the State reach the sum of $1,792,466,673, and undoubtedly to-day are worth $2,000,000,000. This class of property is among the best of investments of money—yielding the highest percentage of income. They are taxed for State purposes only, and in only two ways—upon gross receipts and a percentage on dividends. The entire amount realized in taxes from this property is $2,219,334 75. It amounts to but little above one mill to the dollar of the actual cash value of the property.

Bank stock, national, and other chartered banks is $62,212,580. These banks hold a surplus of $40,000,000, which serves the banks as well for all banking purposes as so much capital stock, making the banking capital of the State $102,212,580. It is taxed six mills to the dollar, for State purposes, on capital stock, nothing on surplus or banking buildings, and pays none of the local taxes of the places where located.

The private bankers and brokers doing business in the State have, in their business, a large amount of money, which, beyond all doubt, is fully $50,000,000. It is taxed for State purposes only, and at the rate of three per cent. on its net income. It yields to the State the sum of $71,467 22—about one and one fourth mills to the dollar. I am told by the Auditor General that there are over forty private bankers in the State who have made no report to him of their business under the law. No report is required unless there is an income. Bradford county shows no private bankers by the Auditor General's report.

If all the property mentioned hereinbefore is not justly and equally taxed with the other properly hereafter to be named, it is the fault of the law, and should be corrected.

The next item we mention is money at interest. The amount, as returned for the entire State, is $115,833,154. This sum is not one tenth of the true amount. It exceeds $1,000,000,000, and is falsely and fraudulently kept from the assessment rolls, and so well is this known, it is the common talk of the streets. It is not so much the fault of the law that it is not on the assessment books for taxation as it is the duplicity and deceit of the money-lenders, and gross negligence of assessors.

This kind of property is taxed at the rate of four mills to the dollar for State purposes, and also for county and school purposes. It pays no road, town, poor, or borough and city taxes.

The next item to be considered is the real estate of the country, consisting of lands, improved and unimproved, houses, buildings of all kinds, and minerals owned by individuals and corporations, except such lands as are owned by the corporations for their corporate purposes. The value of this property, as shown by assessments for county taxes, is $1,663,562,490, a sum quite too low. The returns show the strangest inequality of assessment in the several counties of the State, some being as high as eighty-five per cent. of actual value, while others are as low as fifteen per cent. of the value. There is no reason or sense in this, for real estate pays no State taxes; it pays all other taxes. In my judgment, the value of taxable real estate in Pennsylvania is fully $2,000,000,000, and pays an average of two per cent. on its actual value, many times above the ratio of corporate property, money at interest, and banking capital.

Horses, mules, and neat cattle above four years old, are taxed for all purposes except for State purposes. It is returned at $39,929,649; its actual value is twice this sum, and will reach $75,000,000. Horses, mules, and cattle under four years of age, sheep and swine, are not taxed for any purposes. There is no reason for this; it keeps from the assessment rolls at least $25,000,000, and a large number of farmers in the State are wholly devoted to raising cattle, and dispose of them before they reach taxable age, as the law now stands, and thereby escape taxation.

Household furniture, including plated and silverware, above the value of $300, is taxed for State purposes and for county and school purposes. The returns of this property amount to $2,292,855, and the most remarkable discrepancies and inequality of assessment are shown. Bradford county returns $300 worth—only one man, and only one man in this county has furniture enough to be taxed, and he lives in Athens. Erie county, with her city, returns $600; while Forest county, the least populous and poorest of the counties, returns twice what Bradford and Erie combined do.

If this property should be taxed—and I know no reason why it should not be—it would add $200,000,000 to the assessed property of the State, and there is no reason why it should not pay its just share of all the taxes.

Pleasure carriages are taxable for State, county, and school purposes, and the same strange differences as in assessing household furniture exist here. Bedford county returns $95,000 worth, while other counties of twice her wealth and population return from $2,500 to $5,000. The aggregate value returned is but $4,548,998. It should be $50,000,000.

Gold and silver watches pay a specific tax for State purposes; $1 00 on gold, seventy-five and fifty cents on silver, and here again the worst of carelessness prevails among assessors. We have in Pennsylvania 1,267,767 taxables, and yet the whole number of watches returned is 40,847. Armenia, the least and poorest township in the county, returns gold and silver watches. Freyboro', the richest of its size, returns none, and with other towns in this and other counties, there is no reason why this property should not be taxed for all purposes, at its value, as the single cow is that furnishes milk to the laboring man's family. And were all watches taxed at their market value, it would add ten millions to the property of the State. Offices of emoluments, such as judges, sheriffs, clerks of our courts, are also taxed, as well as occupations, such as physicians, lawyers, and engineers, for State purposes. There is no reason these offices, &c., should not be taxed for all purposes. The aggregate valuation of this property is $77,859,261, a sum considerably too low. It should reach a hundred millions, at least, and there is no reason why a railroad president with a salary of $10,000 per year, or a lawyer or physician, whose business reaches a like sum, should not be taxed at the same rate as the amount of property yielding a like income is taxed. It is but simple justice, bearing alike the burthens of the government, giving protection to these persons.

Hacks, cabs, and stage-coaches are also taxed for State purposes only, and amounts to only $1,229 10. The number of hacks, cabs, and stage-coaches is not given, nor is there any valuation put on them. Undoubtedly, at a fair value, this property would be fifty times this sum.

This closes the list of property taxed as property only within the State of Pennsylvania. There is, however, other kinds of property of very great value untaxed for any purposes whatever. It consists in diamonds, pearls, jewelry, paintings, and pictures and statuary. This kind of property is indulged in only by the wealthy. That it should be taxed, is not for me to say; but when the poor man's little home and only cow are taxed at two per cent., it is well to respectfully listen to his protest. Reverse the condition of these people, place the poor man amidst all this finery and its owner. Make the rich man the laborer. Would not the same protest come up? Human nature is alike in all, and must be respected by governments. This kind of property costs more to protect than the little home, the only cow. The thief is tempted by the size and value of the prize. There is a large municipal indebtedness of cities, boroughs, counties, and towns, held by individuals of the State that is taxed for State purposes. This nets the State the sum of $140,715 30. Will some one give a reason why it should not pay its share of all taxes?

There is a large amount of property invested in the mercantile and commercial affairs of the State. It will reach from two to three hundred million dollars. It is untaxed as property. The operators pay only a license for State purposes, for the privilege of dealing as merchants. This license nets the State the sum of $301,558 61, and this sum is not a mill to the dollar of the capital invested in the business.

That it can be improved, I am unable to say. Then there is a large moneyed interest invested in hotels, saloons, railways, billiards, peddling, theaters, circuses, and patent medicines that pay only a license for State purposes. It nets the State $572,508 65, a sum for taxation probably equal to the highest percentage imposed on any property. These licenses grant special privileges, and many of them are of doubtful moral good, and certainly, in their results, cost the Government vast sums of money in protecting the community. Why should not this tax aid the local govenments? And it may well be increased and so applied. Give us the high license laws. It will do us good. Large moneyed interests seek employment within our State by foreign insurance companies and other corporations that are taxed by way of license, which, perhaps, is the only way of reaching this capital for taxation. It yields the State the sum of $280,560 72. This gives us all the taxable property of the State, and how and in what manner it is taxed under the present law. The figures given show the value of all the property of the State to be six billion of dollars. If all of this property was brought upon the assessment rolls and taxed alike, the percentage of taxation would be very much lessened to cover all the expenses of running the State Government in all its divisions.

The people of the State show a remarkable ability in evading taxation, and it is alike with everybody—the carpenter and banker, the lawyer and farmer, human nature is the same with all. Half the industry used in bringing out taxable property, and having it put upon the assessment rolls, would do as much to equalize taxation as anything that can be done.

That the tax laws of the State are unequal and unjust is universally admitted, discussed, and talked of. There is no part of our jurisprudence so much needs revising and codifying as these laws. We complain of agrarian and communistic doctrines, and justly, too. It is the only element now threatening the peace and quiet of the land, and yet it is not too much to say that the tax laws of the State alone justify an organized protest from the classes charged with agrarian and communistic tendencies.

Note the effect upon the industries of the country. Almost everything is done by corporations—the aggregation of large capital concentrating many kinds of business under one management. It reaches out and covers nearly all manufacturing enterprises and mining industries; is engaged in farming, cattle-raising, wool-growing, and mercantile operations.

These methods of conducting the business affairs of the country aggregate large capital and consolidate many different classes of business under one control and single management. Money is sensitive, and rapidly changes from one investment to another for small percentage of profits, and the difference alone of taxation on corporate stocks, banking investments, and money-lending is enough to take money made in farming to these enterprises and investments because of the greater profit received that otherwise would go to improving and beautifying the home and the farm, thus leaving the fields covered with stones and brush, fences and buildings going to decay, impoverished and uncared for. But this is not the worst effect upon the community. It drives out the small operator and capitalist doing a single business, and utterly destroys him as an independent operator by force of the monopolist engaged in the same industry, who gathers all these industries under one control, makes him a servant, an operative, a laborer, thus increasing the number of dependent laborers, and deprives him of his independence as a laborer by limiting and decreasing the number of places of employment and thereby controlling wages and the value of labor. The centralizing of business in a few colossal enterprises ruling the industries of the country injures the community in two ways. It invests a few with wealth and power dangerously great. It reduces men who would otherwise be principals in independent branches of industry to positions of subordinates, and not only comparatively impoverishes them, but it robs the community of the energy and skill which they would be stimulated to exercise as independent workers when guiding their own affairs and their indifferent employés, glad when the day's work is done.

There is not time on this occasion to carry this discussion to its end; very many topics in the subject would alone consume more of your time than you could spare.

Among them are—

Whether property invested in mercantile pursuits is properly taxed by assessing the vendor, or should it be valued and assessed as land, horses, mules, &c., are ?

Whether the road-way of railroad companies should be taxed as real estate, and the local taxes of the places and towns where the road runs, or by the larger division of the governments, like counties, or wholly for State purposes, as now fixed, thereby giving every taxable the benefit of this property ?

Is not the education of the children of the State a State matter ? and should not the support of the schools mainly come from the State, raised by taxation of corporate property, thus relieving lands from taxation, and making the school more efficient than at present ?

Ought the owner of real estate to pay all the taxes on it when he is indebted largely for its purchase price ?

WHAT FARMERS MOST NEED TO KNOW.

By HON. JOHN A. WOODWARD, *Howard*, *Pa.*

[Read at the annual Meeting.]

If, when I take my seat, those who hear me through shall note that I have failed to answer the query which forms my title, I trust they will charitably forbear the criticism that I have imitated that eminent agricultural lecturer who announced as his subject, "Milk," and then failed to refer to it, even in the most remote manner, during his entire discourse.

I once happened to be a guest at a dinner given to the alumni of one of our agricultural colleges, when, between nuts and coffee, some one was asked to respond to, "What does the Farmer Most Need to

Know?" The reply was: "Just what may be learned at this college;" and while at the time it seemed to me much more strongly marked by its brevity than its wit, I afterwards thought I discovered in it a grain or two of sense, and borrowing the sentiment for a caption, I adopt the germ of the reply as my subject, and beg to present, though in a necessarily hurried and imperfect manner, a plea for a better, broader, more general education of the farmer and the farmer's boy. The somewhat narrow ground occupied by certain who assume to be leaders of thought upon this subject, that the only education needed by the farmer is of the technical character relating specially to his vocation, does not, in my judgment, afford the best stand-point from which to view it, but from it we may profitably take a passing glance:

Nature is no less bountiful now than when she first came smiling from the hands of the Creator; the earth is no less productive to-day than when, in the first garden, the first man and woman had but to reach forth their hands and pluck, to satisfy every need for food or raiment; but the conditions under which she consents to yield up her products for our use and profit, have wonderfully changed, and he who would reap must not only sow, but sow intelligently. This was true a score, or ten score years ago. It is not more true now, but the same truth has vastly greater significance. The time when, in order to laugh with a havest, the earth needed but to be tickled with a hoe, has long since passed; and he who would secure from her a yield which will return profit for his labor, must use more elaborate instruments of titillation, and woo her with a far wider knowledge of her moods and tempers. It is doubtless quite within the memory of many of those present, when the man who lacked the capacity to become a mechanic or artisan; who was not keen and bright enough to make a successful merchant, tradesman, or middleman; whose mental equipment was not sufficient to warrant him in joining the "innumerable caravan" of the professions, learned or otherwise; who was not deft enough to be a barber or tinker, and not quite mean enough to be a politician, was held to be about the right material for a farmer; so he was christened "Hodge," and hitched to the tail end of the plow. But all this has changed: The business that feeds the world has levied tribute upon the highest grades of mechanical skill, and called into requisition the ablest services of science; and to-day the man who would be the most successful farmer must not only be capable of making himself a success in any other calling in life, but must be possessed of the trained mind, the quick intelligence, and the skilled hand which will make him the peer of the best specimens of two or three others combined. To judge correctly of what crops will best meet the demands of the most accessible market, he must have that intuitive insight into business which would qualify him to take high rank among tradesmen. To be able to produce these crops with the widest possible margin of profit, he must know the needs of his crops, and the lacks of his soil; and while this does not require that he should be a chemist, he must be able to understand and intelligently apply the teachings of chemistry. In the battle with the weeds which are sure to contest with him his right to possession of the ground, he will find a knowledge of botany his cheapest and most effective armament; and in all the varied processes of culture, beginning with the turning of the first furrow, and ending with the shipping of the crop, the many modern implements which he finds it profitable to use, from the gang of steel plows, which will "run without holding," if properly adjusted, to the steam thrasher, which will run itself and its attendants to destruction unless properly withheld, demand a degree of mechanical skill in their management, only less than that required in their construction.

Farming will never develop into an exact science, yet it is becoming more and more a system of applied knowledge, and the best farmer is, and will continue to be, he who has the most thorough theoretical knowledge of his work, coupled to the greatest degree of practical skill in the application of that knowledge. In short, he must be a man of many sides, and every side a bright one. Brain-power is the crying need; and the force of a mind trained to exactitude and laborious thought is of as great importance as that of the skilled hand. Manual labor cannot be dispensed with, but must rather be made more valuable and effective, because better applied and directed by the better equipped mind. I do not underrate, nor fail to value at its highest worth, the practical knowledge and manual skill to be gained in the school of the farm, with the practical farmer for a teacher; but I am very sure that I cannot, in this day and generation overrate, nor magnify beyond its true greatness, the importance of the scientific study of farming as a profession, nor emphasize too strongly that it is a business, not only an occupation, and requires training, ability, and powers of mental, as well as physical, endurance beyond most other kinds of business. The truth is, that farming is a profession, though not recognized as such, and he who would make his mark in it must learn it as he would any other, and from the scientific, as well as practical stand-point. Whatever it may have been in the past, the time has come when, for its most successful pursuit, the highest intelligence is a necessary qualification. Of any two farmers, physically equal, he will accomplish most who possesses most brain-power, and who most assiduously and carefully cultivates the crop within the inclosure of his own cranium; and this is true even from that intensely practical point of view which regards the farmer merely as the producer. The investigations into the great truths and principles which underlie the production of man's sustenance, that are now being made by careful students and profound thinkers, fall far short of their possible results in adding to the productive power of the farmer's labor, because he too often lacks the trained mind required to understand and apply them. In a recent address upon the work of experiment stations, Dr. Sturtevant said:

"I have not endeavored to cover the whole field, and in selecting what seems to me the most important problems for illustration of various branches of farming, I may seem by some to have overlooked or underestimated a whole series of work, which is usually considered experimental. I have done this purposely, for advance is not in the line as currently supposed, but must come from the studying into causes, and the laws which modify. Mere local work must be left for the farmer himself; for the station purposes, our work must cover general causes, and furnish clues which may be adapted by the intelligent farmer to such conditions as he finds about him.

To understand, to follow up the work as here outlined, requires some education, and some measure of training. I may hope to be understood by a representative body such as yours, as by other bodies of intelligent self or school-educated farmers, and it is my object to gain your support to such views, in order that the general tone of farmers' thought may be elevated."

The mind of the farmer, *as* a farmer, needs toning up. Laxity of thought and looseness of method too largely prevail. It is too often the case that the farmer hitches himself to his manual labor in the morning, and unhitches himself from it at night, much as he does his team. The brain needs stimulating and cultivating that it may think, observe, invent, as varying circumstances require, or changing conditions demand. Nowhere more than on the farm is needed the disciplined mind, capable of exactness in method, aiming at and accomplishing definite results. "Think of the forces, the properties, principles, influences, the laws—developed and undeveloped—with which the farmer must come in contact, and understand, if he would succeed. So far from being less dependent upon the arts and sciences than those engaged in other occupations, he stands in need of a far wider range of knowledge than is requisite in almost any other business. Men of one idea cannot succeed in farming, and those engaged in it should lose no opportunity of adding to their present stock of ideas by reading, by investigating for themselves, and through intercourse with others." Brains are not lacking on the farm; nowhere are they to be found in greater abundance, nor of better quality; but we have set the limit of their special education and cultivation at too low a standard, and they are right, so far as they go, who insist that, from the most practical point of view possible, "Knowledge is power," even upon the farm.

But there is a higher and more advanced ground from which we should view this question: Citizenship is greater than profession; manhood stands before vocation; the man outranks the farmer. Whether one be priest or soldier, citizen, tradesman or farmer, he is first a man and citizen; and that viewof his educational equipment for life which limits it to service in the narrow field in which he gains his livelihood, tends to contract his powers, hamper his energies, hedge in his usefulness, and assign him to that unimportant part in the management of affairs to which he is, by his foreshortened acquirements, adapted, and which he has hitherto filled much too exclusively for the common good. For this larger, more extended view of what the farmer most needs to know, I make my urgent plea.

True, his special work is mainly of a manual character; true, he feeds himself and the world largely by the labor of his hands, but "a man's a *man* for all that," and if he is to bear a man's full share of the world's work, he must be accorded a man's fullest and most complete furnishing.

The farmer boy of to-day is to be the farmer of to-morrow, and, as I hope and believe, much more than that. There is no better material in the world to make men of, men fitted to fill any place that may call for them, or do any work that may fall to their lot, than farmer's boys. "There is no place on this green earth so well adapted to perfectly develop mind, muscle, and manhood as the farm. There boys have the purest air, the freshest and most healthful food, plenty of exercise, the brightest sunshine, and the soundest sleep—the very conditions necessary for the highest development. The surroundings of farm life are better calculated than any other to call out what there is in the boys, and develop full-grown, healthy, perfect, self-reliant men." These are the men we want, not only on the farm, but off it. We want them for our future governors, law-makers and judges; our leading surgeons, eminent divines, successful railroad managers, and great engineers. We want them everywhere for these positions and thousands of others of trust and responsibility, waiting always for young men of sound bodies, clean hearts and level heads, just such as the farm can furnish, to fill them.

"But," says some one disposed to be critical, "you are not talking to the point, you are not sticking to your text." Very well! I intimated as much when I begun. Further, you are unfitting the boys for farm work, and educating them away from the farm, not for it. To meet this point I will temporarily admit that it is well taken: Let them alone and they will come back to it. There is a great deal of twaddle talked and written upon this very subject of keeping the boys on the farm. It is nonsense to assume that all the boys are needed on the farm, any more than are all the girls, or calves, or colts. They are the very best crop we grow, and what we want to do is to make the most of them, and put them where there is the best demand for them, just as we do our other crops. We don't need them all, and the towns and cities do. If they want to go, let them go. We want our boys to be successful, and to this end their life-work must be done in the direction in which their talent lies. If the boy does not like the farm, you cannot make him like it, nor can you make a successful farmer of him by forcing him to remain upon it. Study his tastes; note carefully the direction in which his inclinations run, and help him on in that. Teach him to be courageous, thoughtful, earnest, self-reliant, and then encourage him to climb any ladder toward the top of which he may be disposed to look. The chances are about even that after he has reached the top, and made himself a success, he will turn again to the old farm, or to a new and better one, and prove a better farmer than he will if you thwart his early ambitions, or dwarf his mind by *limiting* his education to the narrow plane required to make him *merely* a successful farmer.

Now let me go back to the charge that to educate the boy is to unfit him for farm life, that I may deny the contemptible slander. Do you tell me that a widened education, a broadened understanding of the laws which govern the universe, and an enlightened view of the relations which man holds to his Creater and all his co-creations, tend to drive him from the pursuit of that vocation which first received the Maker's sanction when "the Lord God took the man and put him in the Garden of Eden, to dress it, and to keep it?" The charge is as monstrous as it is slanderous. Do you mean to assert that that training in the sciences which lies at the foundation of the power of mind over matter tends to force man from that occupation which brings him into daily contact with the things of nature, and into some of those which are but subsidiary to, and dependent upon, it? I say that the assertion is an insult to the farmer, and a calumny upon intelligence. The sixteen thousand school-houses scattered through the country districts of our State enter their eloquent, though silent, protest; every grange hall within her borders is a dignified refutation of the untrue thought; and all the thousands of intelligent, educated men, who are giving every energy of mind and body to pushing on the car of agricultural progress, are living witnesses that the charge is a lie, and that education does *not* unfit a man for the farm.

But granted that the boy is to be educated for the farm as his life-work, shall he not also be educated up to the highest standard of the privileges and duties of that citizenship which is his by inheritance and right, as certainly as it is that of the man who sells him legal advice for cash, or barters him groceries and dry-goods for produce? Is that imaginary line of distinction that custom seems to have drawn between the "man of business" and the farmer so nearly real and tangible that it must needs intervene between the farmer's son and that broad, liberal education which will qualify him to be as much a business man, or man of affairs, as his brother, who merely buys and sells what he produces? Well says Charles Richards Dodge, "The earlier the farmer essays to look over the stone wall that separates him from the *business* world, the better it will be for himself and family, and for American agriculture;" and the ladder by which he may climb to the top of his bugaboo wall, if such there be, and scale its only imaginary heights, is the generous, liberal education which I stand here to advocate.

We are a nation of equal freemen, and every man in it is a sovereign; but shall sovereignty, so far as its supreme function—that of enacting the laws under which we live—is concerned, be relegated to that class of citizens alone whose vocation it is to afterward explain them, or whose duty it may be to interpret and enforce them? Verily, not; and yet, practically, it is so. Everywhere we hear the complaint, long, loud, and deep, that lawyers make the laws, and that there is not a due proportion of farmers to be found in our legislative bodies, either State or National, and the complaint is a just one. The fact is as stated. But why is it? Do not misjudge me if I assign as a possible reason that the lawyer, by virtue of the greater breadth and depth and extent of his education—by reason of his more general and generous mental equipment—is, as a rule, the better qualified for the position. No one can insist more strongly than do I that there should be more, very many more, farmers in all our law-making bodies; but then I insist, just as strongly, that there should be more, very many more, farmers better fitted and equipped for these positions. I am glad to believe that I am in accord with the best thought of the day upon this subject, and that, instead of advocating a new departure, I am but adding my mite to give momentum to a movement already under way. "There is a political future for the farmer, without regard to party." He is to take a higher place in governmental matters, and to have a more potential voice in public affairs; and this because the mental training which fits and prepares for these public duties is becoming more general among farmers and their sons. Let the good work go bravely on. Educate the farmer boys, that we may have farmer men competent to fill, and fitted to grace, any public position to which they may be called.

And to this end, let me urge, as a practical closing thought, the encouragement and patronage of the agricultural colleges, provision for the establishment of which in all States was, some years ago, wisely made by the general government. I confess that I am not in sympathy with that view of the work of these institutions which would *limit* it to the teaching of the practical details of practical farming. I am not one of that small but intensely active class, quoting from one who has had large experience in the education of farmers and farmers' sons, "who constantly, in season and out, preach the doctrine that farmers' sons shall be educated only in the direct line of practical farming, and who inveigh with special unction against those 'literary fellers' who assert that the farmer is a man with a soul, and not a mere machine for extracting from the soil crops of corn and herds of cattle and hogs; and that, as a man, he is entitled to a knowledge of men, and the literature, science, and laws of men. The 'education of farmers' should be a broad and general culture; so broad, indeed, as not merely to retain in the student his practical skill and interest in agriculture, but broaden and intensify his sympathies in that direction."

No harm will come to him by association and fellowship with those who are fitting themselves for other lines of life work. No injury will accrue to him by daily attrition, in his college days, with the men with whom, in after-life, he will come in business contact as bankers or doctors, lawyers or railroad managers. There is no way of preventing him from associating with these men in the active life of after years, and there should be no attempt to separate him, as a goat from the sheep, in his training days. With Prof. Morrow, "I hope to see the time when the belief in the value of a liberal, special education for the farmer will be so strong that it will no longer be thought necessary to keep the student of agriculture from association with those preparing for other occupations, or to secure him by remitting his fees, or requiring a lower standard of preparation."

I must not, however, be misunderstood as insisting that a course in college is the *only* means by which the generous education which I have come here to claim for the farmer may be obtained, nor as intimating that a graduate's diploma will stand as a certificate for that enlightened intelligence which will fit a man to be at once the best of farmers and the best of citizens. If this were true, then must our hopes be indefinitely postponed; but it is not. Wherever the common school, constituting, as it does, one of the grandest achievements to be credited to Pennsylvania's great name, has faithfully performed its *only* legitimate work of investing the youth within its reach with a thorough rudimentary education, the young farmer who has passed the college period, but who has yet three-fourths of his life before him, has a foundation whereon he may, by his own unaided hand, build such a superstructure of intelligence and culture as will make him a peer of the realm of scholarship, and fit and equip him for any duty or position that may come to him. The world has never been so filled with the riches of knowledge as it is to-day, and never before have the facilities for obtaining it been so easily within reach. The land is literally flooded with good books and good papers, better in quality, greater in quantity, and less in cost than ever before; and any young man may take up any line of industrial work, and find the means for obtaining a complete theoretical knowledge of it ready to his hand, requiring only that he shall have energy enough to utilize it.

And now, if a specific reply to the query, "What does the farmer most need to know?" were required of me, perhaps I could not better epitomize my idea than in the single word, "more." More of the practical details of his work; more of the principles and truths which underlie it all; more of science, more of politics, more of art, more of literature; more of any and everything, in every department of human knowledge, that will tend to broaden and enlarge him to the full stature of manhood and citizenship. Certain it is, he can never know too much. The more he knows—the better he is educated and informed—the larger man and better citizen will he be, the broader the mark he will make on the pages of the world's history, and the better, because the more potential, friend will he be to himself.

WHAT ADVANTAGES DOES AGRICULTURE OFFER A YOUNG MAN ABOUT TO CHOOSE AN OCCUPATION?

By GABRIEL HIESTER, *Member from Dauphin.*

One of the most important steps that a young man has to take is the choice of a profession. On this choice, in a great measure, depend his future success and happiness.

Nature has wisely endowed men with different tastes, different capabilities, different impulses, widely different capacity for business and enjoyment, and has furnished widely different occupations, so that every one may have work and pleasure suited to his peculiar tastes and capabilities.

In the choice of a profession, a young man is generally influenced by his tastes. His tastes are, to a certain extent, acquired by association. He naturally thinks first about that business or profession which he has seen carried on during his boyhood. If his father is prosperous, his thoughts natually turn to his occupation as the one best suited to him. If his father has a hard struggle for a livelihood, he just as naturally determines to seek his fortune in another direction. Every one would like to look forward to a middle age of ease and comfort, and just here how many make the great mistake of their lives, under the impression that the surest way to secure this is to amass a large fortune.

Our daily papers abound in instances of men who have, after a season of apparent prosperity, during which they enjoyed the confidence and respect of their fellows, become reckless in their mad desire for wealth, forgotten the duty they owed to themselves and their fellows, proved false to their trust, have been discovered, and, broken in fortune, they spend their remaining days disgraced, dishonored, and shunned by their fellows, if they are so fortunate as to keep out of a felon's cell.

It is true that money honestly earned and judiciously expended brings with it comfort and enjoyment, while without it life is, at best, one of hardship and privation. But to properly appreciate and enjoy the possession of anything, we must at times feel the want of it.

If we look carefully into the lives of men in all classes, we will find that those who enjoy life most, who give most enjoyment to others, who do the most good in proportion to their means, who leave behind them the cleanest record and are most regretted when they die, are the well-to-do and moderately wealthy farmers, mechanics, merchants, and professional men, while those who have been most successful in accumulating money, whose names and business transactions are lauded in our daily papers, who are honored as our money kings, and who are too often held up by parents as an example for their sons, are, as a rule, the most unhappy and discontented of men. Their lives are the most barren of everything that pertains to true happiness and true comfort. Looking at the question from this stand-point, let us see what inducements agriculture has to offer any one about to choose a profession.

If a farmer manages properly, he will have a peaceful, quiet occupation, free from heavy risks and great excitement; and while he has his busy seasons, during which, for days at a time, he is obliged to work early and late, and make use of every available moment of time, he has, in the course of the year, as many leisure hours and days as a man in any other business; and when these leisure hours come, he always has the means right at hand for enjoying himself, and giving innocent enjoyment to his family and friends. When his day's work is done, he can go to bed and sleep soundly till morning, when he awakes refreshed and invigorated, feeling indeed like a new man. He can always have plenty of pure, cold water to drink. When he is at his work or in his home, by night and by day, he can breathe pure air, untainted by coal-gas, sewer-gas, or the effluvia from the wharves or the fish-market; can see his children grow up rugged as pine-knots under the genial influence of pure country air, and good, wholesome food. He will have one of God's greatest blessings, a good appetite, and his table can always be supplied with an abundance of just the right kind of food, home-grown and fresh, such as sweet butter, rich cream and milk, fat, juicy poultry, fresh eggs, fresh vegetables taken right from the garden the same day they are eaten; luscious fruit from the day the first strawberry makes its appearance in early summer till the last pippin and russet apple disappears late in the spring, while his larder can always be stored with the finest canned and dried fruit, preserves, and jellies, free from glucose or any other adulteration. These are luxuries which are always expensive and generally unattainable at any price in the large cities.

He can have a good horse and a comfortable carriage at his disposal when he has occasion to drive out either for business or pleasure. He has the satisfaction of seeing that whenever he makes a well-directed effort in any direction, nature comes bountfully to his aid and carries on the good work even while he sleeps, and while his bank account may not compare with that of some professional men and merchants, he can always keep the balance on the right side, and see his farm increasing in value, his home becoming more beautiful, and all his surroundings improving with each successive year, and when a money panic sweeps over the country, causing the supposed fortunes of thousands of business men to melt suddenly away, he stands secure, because he has only to depend upon a bounteous nature for support, whose gifts are not dependent upon the rise and fall of any market, and who never puts more water in her stocks than she is able to carry.

"But," some may say, "if this be so, why do we see so many farmers of middle age, broken in health and spirits, with hardly money enough to buy a wheel-barrow, much less a family carriage, who live the year round on salt meat and potatoes, work hard from daylight till dark every day in the year, and yet are always behindhand in their work and their payments?" I answer, these are men out of place; as a rule, they have no advantages of education; as boys they were taught that the chief end of man was to work, that time spent on book-learning or devoted to recreation was so much time wasted; they grew up laborers, with no idea above the actual labor of their hands, and no knowledge of business or business methods, and now they must be satisfied with laborer's wages and laborer's fare.

They have not the capacity to manage for themselves, and would be a great deal more comfortable if they would work for some one else. What I have said does not apply to this class, but is intended for men of intelligence and energy, who have the capacity to rise in other walks of life, who would not be content to remain at the bottom of any profession. To these, I say, agriculture holds out the inducements above enumerated.

To this, as in other occupations, overcrowded as they all are, there is plenty of room at the top, and for those who, by careful, determined effort, will reach the top, there awaits the sure reward of comfort, honor, and a middle life and old age of comparative ease, lived amid the most pleasant surroundings.

It is true that many farmers fail even after a few years of success; but in every instance the cause can be traced directly to outside influences. Either he has been induced by friends to run for a political office, or he has gambled in stocks, or has indorsed for a dear friend who was as sound as the State itself and only wanted his name for form's sake, or has invested all his surplus capital in a manufacturing concern, or engaged in some other enterprise of which he was entirely ignorant, and to this he can trace his failure. I cannot recall a single farmer of my acquaintance who stuck closely to his business, and devoted all his energies to that one thing, who has not bettered his condition with each successive year. And if farmers or others will engage in enterprises, the management of which they do not understand, they must abide by the consequences, which in nine cases out of ten are disastrous.

In order to secure the greatest profit from our farms, we must become specialists; the time has gone by when farms can be managed in the good old-fashioned easy way; the country is becoming too much crowded for that, and competition too brisk. No one man can hope to excel in all the various departments of agriculture, but each one must adopt one particular product, for which his farm, by reason of its location, as regards the different markets, and the quality of its soil is especially adapted, and throw all his energy and all his mind into that one channel, so that the product of whatever kind shall have an individuality about it that may be recognized at once.

Thus, if he select fruit, he should go further than that, and whilst he may furnish a general assortment of fruit throughout the season, he should make a specialty of one particular variety, and, by constant care and close study, not rest satisfied until he grows that one crop in greater perfection and abundance than any one else in the market, and by the excellence of the article, and the care with which it is put up, and the uniform good condition in which it reaches market, create a demand for that particular brand which will insure its sale at good prices, even though the market be overstocked with inferior goods.

The same with milk or butter, if either of them should be selected. Let others dilute or adulterate as they will, the man who, by careful selection of his cattle, judicious feeding, absolute cleanliness about his stables and milk-room, accurate and intelligent handling of the milk and butter in all its forms, will always furnish a strictly pure and uniform article, will not only always find ready sale for his produce at fair prices, but his brand upon an article will carry with it a guarantee as to purity and quality that at once satisfies the buyer without further test.

If he choose stock, he should not only try to raise good stock, but should settle upon some special breed of horse, cow, sheep, or hog, and try to bring it as near perfection as possible, so that this particular strain shall be specially desirable and command an extra price. And so I might go on enumerating indefinitely, but I have given enough to illustrate my point, that our success depends upon our knowledge of the business and the care and accuracy with which we do our work; and I am sure I know of no occupation that presents a wider or more inviting field to the young man whose tastes run in that direction.

In looking around over the families of prosperous farmers, we find, when the sons arrive at the age of manhood, the bright ones generally leave home and either study a profession or go into business in the city, while the dull ones are left to keep the farm.

In every city we find a few successful merchants and professional men, who, by their own energy and superior business ability, have worked their way up from very lowly stations until they have become the most wealthy and influential men in a great city. These are very properly held up as an example to the boys on the farm and elsewhere. But, while we are all familiar with the names of the few successful ones, we never hear of the hundreds and thousands who fail. Bright boys who have left home full of life, and hope, and high ambitions, carrying with them the blessings and fondest hopes of loving parents, who have, by some unforeseen circumstance, or perhaps misstep, lost their hold upon fortune, and have never been able to regain it, but struggle along constantly oppressed by adverse fate, live their few brief years of toil and hardships amid the heat and dust and turmoil of the city, always hoping for something better, always disappointed, until at last, worn out by the effort and utterly discouraged, they drop out of the race and are never missed, their places having been filled in advance by other bright boys from the farm.

Those who fail by far outnumber the men who succeed. Many have gone to the city to engage in business, and, after a few years, have died discouraged and broken-hearted, who would have lived a life full of comfort and enjoyment had they remained on the farm.

The impression used to prevail that the farmer did not need education; that it would rather prove a hindrance to his success, and until very lately what was called book-farming was ridiculed, and farmers who read books relating to their profession were regarded with distrust. Even at this late day, after the advantages of education have been so clearly demonstrated, we find some good farmers, men apparently of sound sense and good judgment in other respects, who hold the opinion that the best kind of education for a boy who intends becoming a farmer is that which trains his hands to the use of tools, and which treats entirely of the mechanical details of his business, leaving out entirely the great principles that underlie the science of agriculture, and all branches of learning that have not a direct bearing upon the work of the farm.

I hold that the farmer cannot be too well educated. He needs literary training to enable him to draw the greatest benefit and fullest enjoyment from a quiet home during the comparatively idle days and long evenings of winter—for what is leisure without books? and just in proportion to the breadth of his knowledge will he his success. It stands to reason that, since he has to make daily use of the forces of nature to carry on his business, since he does not arrive at a single result in all his operations without the aid of nature, which always works according to fixed and unalterable laws, the best preparation he can have for the successful prosecution of his work is a thorough knowledge of the natural sciences, a knowledge of the principles that underlie all changes that are constantly taking place around him—in the air, in the earth, in the plants that grow upon the earth, and the animals that feed upon these plants.

I do not mean to convey the impression by anything I have said that the farmer does not need to work; that his life is one long holiday, spent under wide-spreading trees in shady lanes and on the banks of cool and pleasant streams. Far from it. I do not think such a life would be desirable. The man who does not have to work does not have the capacity to enjoy his leisure to the full, and gets only one fourth the pleasure out of life that he is entitled to. It is this consciousness of duty faithfully performed that enables a man to enjoy properly his hours of rest, and it is only by close attention to business, and by the most unceasing vigilance, that the farmer is enabled to succeed and hold his position among other business men.

But if you will go with me through any of our best agricultural districts, and observe the farmers at their work and in their homes, you cannot help but notice the sturdy, robust bodies, fully able to do the work with ease that they are called upon to perform, and the jovial, contented look upon their faces, even in the busiest season.

Now, go stand on a street corner in the business portion of one of our large cities and watch the crowd as they pass; see how they hurry as if their lives depended upon getting to their destination immediately; how anxious they look, how many careworn faces bearing the stamp of overwork and disease plainly upon them! Or, go further, to the stock exchange, grain exchange, or gold room, and look at that crowd; see how they push and jostle each other; how their eyes protrude; how they yell their orders to the auctioneer; how their entire frames are shaken and swayed with excitement; what a perfect Babel they live in! Mark the utter despair of the man who has just lost his all by an unforeseen change in the market. Compare the expression of those men with that of the farmer you have just been looking at, and then tell me how long should a young man of quiet taste and domestic habits hesitate before choosing an occupation?

EXPECTATIONS AND EXPERIENCE.

By H. H. COLVIN, *Member from Lackawanna county.*

The beginner in stock-breeding, especially if he be inexperienced, has a delightful prospect of an easy success. In the commencement of his career, as in the morning of life to most men who have any attraction in their composition, any energy or fitness for their calling, all is bright and clear. Knowing that like begets like, they have only to secure the right kind of stock and go ahead. They imagine that they have nothing to do but to acquire the requisite amount of land and buildings, and then add the stock. If the offspring of their stock the very first season does not make them breeders, what can?

With very different thoughts the breeder of sixty years' standing looks back upon his work, however successful. The more successful, indeed the greater the strife has been, and the more difficult the task accomplished. He is now familiar with the impediments, pitfalls, and stumbling-blocks of the journey, the disappointments of early hopes, and the more than compensating joys of successful labor.

It is impossible that any business which is so much of an art as stock-breeding, which involves so much of science, should be so easy as the beginner is ready to believe. It must be diligently learned, and unless the breeder applies himself to the study of its principles and details he cannot succeed. A competent mind, with all the force of a strong and resolute will, may succeed in multiplying animals, but cannot succeed in extending the grand work of improvement. According to his industry and circumstances beyond his control, which tend to regulate the measure of each man's success, he may reap pecuniary profit, more or less, but to become a really successful breeder, he must exercise higher powers of intellect than are necessary for the management of ordinary business. He has to do with living creatures, with organisms subject to natural laws which he cannot alter, and which these very laws constantly thwarting his aims. The workings of these laws he must watch, follow, and assist.

To become a master breeder, he must be the servant of nature. He must stoop to conquer. By patient and intelligent observation, step by step—not by sudden flight—he may become an eminent breeder; but he never will be so, in the true sense of eminence, by theoretical learning alone, or by the labor of other men; that is to say, by obtaining good stock without knowing by practical lessons how to use them, and how not to use them. Failures are annoying, and often discouraging, but they are not always a dead loss. The courageous worker may draw from them practical lessons for his future guidance. The highest success may be reached by the wise use of failures. Volumes may be written upon the principles of breeding, the laws of nature, and the details of the breeder's practice, and the same may be very good and very useful in their way; but, after all, the road to success must be found out in practice by each man for himself. Journals and books may set up serviceable landmarks to indicate the whereabouts of the path, but each traveler must look to his own footing as he goes, for the way is hazardous and the end uncertain. Is it true that like produces like? The answer to this, as to all questions that are problematical, is that, with certain material qualifications, the saying is true. The assertion taken singly and alone is misleading.

It is the qualifications back of it that call for attention and require to be studied. No one thing, be it ever so true, can be relied upon while the business of breeding is so complicated. The appearance of one calf quite the likeness of its dam, or its sire, or of both, is not necessarily a key to what the second or third offspring will be. We think it is not extravagant to say that prepotency may now and then appear taken up from remote ancestry, and, singular as it may appear to some, have a more pronounced effect upon the present production than the immediate parents. By this means we are able to explain how a given pair of animals may, as they not unfrequently do, bring forth progeny better than themselves, and the principal works both ways, as not a few have been disappointed at an evident retrograde movement with breeding.

In this way we have the fact forced upon us that we must accept the doctrine in a qualified sense.

If animals could be stereotyped in the breeding, would not one of the strongest incentives to breeding be taken away? Many take up breeding as others take up games of chance, enticed to it in part by the belief that they can show a higher degree of skill than others who have staked their all and lost. The man who starts out at breeding in the belief that he is only to stereotype animals in moulds shaped by another, with no prospect of winning the title, skillful breeder, has a tame prospect before him. If the breeder could always know in advance exactly what a calf in shape and color was to be, would breeding have the infatuation it now possesses? Not by any means. The greater the difficulties, the greater the gratification, if it becomes manifest to all men that it has been planned to do a difficult thing, and the result is creditable. The aim of the present day is to scientific breeding, and anything less than this will not be tolerated.

It is true that we cannot make a rigid mathematical demonstration of it, or reduce it to exact practice, for there are things which influence breeding that man can never find out.

The Great Creator of beings alone is cognizant of all these. Still, with practice and minute records, and subsequently carefully studying them, we may become much more certain of results than we now are, and considerably less will be left fòr guess work in a haphazard way.

We read and hear about pioneer breeders of our improved varieties of stock forming a type and fixing that type as the permanent property of their stock by sure hereditary transmission.

It is true that a new type may be produced by skillful and persevering attention to certain rules of practice, in artificial addition to nature, and that so strong a tendency to breed true may be established as to make the perpetuation of the type, under favorable circumstances, a matter almost of certainty. But the favorable circumstances are necessary. The form, size, color, habits, and other properties of animals are subject to modifications, not by breeding only, but by food, climate, and other circumstances of daily life, and modifications ejected by such circumstances become in course of time as strongly hereditary as those effected by selection or by cross-breeding. It is well to keep this fact constantly in mind. Without the breeder's skill, no amount of good management can secure identity of type, but without the external aids to fixity, no amount of skill in the breeding of the animal can secure it. It is the want of these aids often, as much as injudicious breeding, that causes degeneracy.

Nature, left to herself or receiving uniform assistance from man without any designed interference on his part for the control of form and other characteristics in general, will not permit variation beyond certain limits; but if man wants to make alterations, here is his chance.

These same variations may be by him guided in any one direction until the barrier lines are broken, and developed variations branch out from the old stem. So long as there is no design, so long as man's will is neutral, this does not occur. There is nothing to overrule the even influences which favor constancy of type. Thus, out of minute degrees of variation, man constructs his sub-type, and effects his improvement in one direction or another according to his needs. In the finest results of his skill, there is much to admire; much that may well justify feelings of astonishment, yet we must not lose sight of the fact that these extremely good results are but the outcome of patient labor. No one who knows the variety of facts presented to the observation of him who studies nature's process, will consider this an unimportant acquisition.

The common notion among men that stock-breeding is but a dull repetition of the most familiarly known events will not be shared by the genuine breeder who knows the number of curious, interesting, sometimes surprising and perplexing, incidents that enliven it. To obtain, before the completion of a life's work, something like a life's plenitude of knowledge, he must mix his life, to some extent, with the lives of other men. The breeding of the higher classes of farm stock is not a stationary, non-progressive business. These intricate details are not to be guessed at, neither learned by tradition. This is not an age when progress is made by groping, plodding, or guessing, but only by close study and active enterprise.

Those who rely upon tradition and hearsay influences are left far in the rear, and the breeder who justly comes under these criticisms may as well go back to the plow, and consider himself best employed, like Cain, in producing the fruits of the field, for he will not be likely to succeed in furnishing a perfect animal sufficient for a complete sacrifice.

HOW SUCCESS IS ACHIEVED.

By M. W. OLIVER, *Member from Crawford.*

[**Read at the annual meeting.**]

When Prof. Agassiz was asked to become a member of a firm, with the assurance that he could make "any amount of money," he replied: "I have no time to make money." The principle of this doctrine is the secret of success in life. It means, choose a calling and follow it. If a man had the power to multiply himself, to issue himself in many copies, and each copy to apply itself to some business, he might, if he were a capable man, succeed in all. But each man can apply himself only to his own business and succeed. This is the secret—concentration upon one business. Agassiz had no time to make money to be a statesman, lawyer, or mechanic; no time only to be what he was—a scientist—and he had a specialty in that. All his energy was devoted to this purpose, and he succeeded. We have here an example most conspicuous, conclusive, and encouraging. It only needs a relish or bent for the thing, and then careful, persistent application, being guided ever by facts. By taking this course, a person cannot fail being successful—it is simply the result of a cause. Hence so many succeed in this progressive age. Hence, also, for the lack of it so many more fail. Would you have success, then go regularly about it and secure it. It is like doing a "sum," it will always have the same and the correct answer if done right. It may be done in different ways, but the ways must always lead to the same thing, as different roads lead to the same place. It is discipline, generally, which develops men and women, and wins them success; accidents rarely. There must be, of course, natural capacity, and with this capital to start with, the mind that submits to discipline is ordinarily more than a match for those favored by the accidents of birth or fortune. Parents should seek to know the capacity and bent of the child's mind, that they may more intelligently give them opportunities which will fit them for the calling in which they will be most likely to succeed. That was a wise answer of the father's, who, when asked if he was going to give his son a college education: "No, sir," he replied, "I am not going to spend five thousand dollars on a ten-cent boy." His idea was to fit the boy for the calling he possessed capacity for. Discipline is only another word for training, and training is what gives efficiency. The soldier is trained; the clerk, the bookkeeper, the mechanic, the teacher, and men of all other callings. Those trained to the highest point of efficiency, as a rule, succeed the best. All children, boys or girls, should be well educated. It is a mistake to suppose that because people are poor their children must grow up in ignorance. I have no sympathy with those who believe "there is a division in labor, and that Providence has ordained one class of men shall work with their heads and another with their hands. That the great mass of the people are to *to be* hewers of wood and drawers of water." Such would fain tell you the farmer needs no education; needs to know nothing but how to plow and sow, reap and mow; needs not to understand the great laws which God has given nature; need but to live, die, and be forgotten. Such a one has not lived, he has only existed. Man's life is not to be measured by the number of years he has existed, but by the number of years he has lived. Moral training should begin in infancy, because then the first steps are most easily accomplished. And yet it is often neglected then from a mistaken sympathy with tender years. "Too young to discipline now," is the excuse. But waiting does no good; it only confirms wrong habits, and makes the task more difficult when it comes. Begin early—why not? The indulgent parent mistakes, indeed, shows the weakest kind of judgment, in supposing that crosses, disappointments, and heart-aches can be warded off from children by a uniform gratification of childish fancies, or that such indulgence will guarantee them happiness in future years. The world is full of trials; no fortune ever amassed could purchase exemption from them. Nor would we, for 'tis after the victory is won, the crown is given. Make your calculations sure before you go to work, and then work, work with vigor, work continuously, persistently. Every day, every hour of the day, will show some advance made. In a dozen years these what strides are made! How, then, in a life-time? It is this—all conditions together—that is required for the high success that see we in the comparatively few great men of the world. They first started right—first planning right; they then applied themselves unremittingly, not blindly, not at haphazard, not doubtingly; they knew what they were doing, and they knew success would attend them if they continued. Hence they had patience—a necessary, an important, an indispensable part. What was more, they loved to work; they were stimulated by the prospect of success—not the prospect, but the certainty, if life and health were spared and means permitted —but means were made if lacking. So much will resolution do. Perseverance and its success are applicable to all the departments of life —farming, the trades, the professions, science—any pursuit whatsoever. Simply start right and persevere. Do careless and negligent men ever amount to much? Do not the masses succeed in accomplishing just what they do, and no more? We have cause and effect in our hands to work with. Whatever we do, so it is, and no other way. Hence the man who does not rise in life is "looked down upon," because he let his opportunity go by. Industry is highly lauded by the appreciative. It is known to be the great lever that lifts us to success, but it must be properly set and used. "To live well," says one, "is a greater blessing than life itself." It is a duty we owe the world, a duty we owe our Maker, to glean from each passing moment all we can. Duty should be the inspiring thought. Just before the battle opened in front of Fredericksburg, a captain said to his men: "Boys, *we* are to have the honor of opening the fight to-day." A brave and noble-looking soldier at the head of the company answered: "Captain, the word honor has no inspiration for me; it is *duty* only that gives me courage to brave the danger before me." It is he who sees the duties which surround him, and takes them up one by one and discharges them, who lives well, and makes life a blessing—a success. The boy who wills to study can make a man of himself, even though he is poor. Out of the twenty-one presidents who have ruled in our country, nine were the sons of poor farmers. It is not an absolute necessity to the boy who is determined to learn, that he shall enter college; it, of course, would be a great aid. If a little is read each day and properly digested, as a heatlhy stomach digests food, wonderful progress will be made towards fitting one's self for the sterner realities of life. It is not, however, in the multitude of books and papers that we are to look for success; it is in the mastering what is learned—digesting thoroughly and making use of what we get, making it our own, familiarizing ourselves with it. During the nullification times in South Carolina, when the tariff was the subject of unmeasured denunciation by all aspiring politicians, the first railroad from Charleston to Augusta was built. A squire with an honest farmer from the up-country, were driving quietly through the piny woods region, when they came upon the iron track. While they were stopping and wondering what was the purpose of so novel a thing, a train came thundering along, struck the buggy, knocking it into pieces, and hurling the occupants to the ground. Fortunately, the sandy soil saved them from broken bones, and, upon picking themselves up, the farmer exclaimed: "I say, Squire, what in thunder was that?" "I don't exactly know," replied the Squire thoughtfully, "but I've read lately a great deal about a tarnal critter they call the tariff, and if that isn't it I don't know what it is." Here is an example of reading without thought, a failing to comprehend in any sense the knowledge of the writer. Again we would repeat, thinking should always precede working in all things. Those who think the best succeed the best, if they carry out what they think. The winter is before us; let us learn our farming then, and apply it in the spring and summer. Here is a chance—a golden opportunity, especially for the young farmer, the beginner, who has all before him. Let it not be said that it is the old and best farmers that study the most. They have learned the importance of knowledge, particularly in this present progressive age, when it requires much time to keep up with the improvements that make the competition which is the test of our agricultural success. We *must* learn to keep up, or we shall necessarily go back. A clear, disciplined mind enlarges, increases its strength, and is at all times ready for action. Such a mind is a positive power, to be used at will and effectively. It is the only mind that does the business of the world, pushes on its progress, works out its problems. It is the only mind that has to do with the stars, the earth's crust, the passions and principles of the human heart, establishes science, works out inventions, and presents us with the intelligent and successful man.

BOUNDARY LINES.

N. F. UNDERWOOD, *Member from Wayne county.*

Boundary lines, in the broad sense of the term, are those divisions, natural or artificial, which separate nations, states, and their lesser sub-divisions from each other. When applied to the holdings of individual land-owners, they are the lines which divide one man's land from the lands adjoining it. Among natural boundaries, the most common are mountain ranges, sea and lake coasts, and rivers, and these, which may be called geographical lines, are necessarily crooked and irregular. Parallels of latitude and meridians of longitude furnish a convenient means of designating points of separation, and by the aid of the surveyors' art result in straight lines and right angles, giving to districts or counties so divided a more orderly appearance when represented upon the map. In parcelling out lands for individual ownership, various terms are used to designate the plots into which it is divided, and the size of these plots varies in different localities. In the Western States and Territories, the unit of division is the section, which is one mile square, and contains six hundred and forty acres. Thirty-six of these sections constitute a township, and each section is designated by its proper number. In Pennsylvania, the original plot is called a tract, and to each tract, the title to which was originally in the State, is appended the name of the original purchaser or patentee, who is termed she warrantee. These tracts vary greatly in size, and while, perhaps, the majority of them range between three hundred and four hundred and fifty acres, many are much smaller, and some larger. In shape, squares and parallelograms predominate, but so little regularity has been observed in making the original surveys, that a warrantee map of many townships and counties bears more resemblance to the modern "crazy quilt" pattern, than to the regular chess-board arrangement of the Western land map. In designating sub-divisions, or parts of a tract, the terms "lot," "piece," or "parcel" are in common use. The boundary lines of land should be accurately and definitely established, and must be specifically and exactly set forth, at length, in the instrument of conveyance, or title deed. There must be a fixed and clearly understood starting point. From this line must run, and must be described in conveyance as running, either in a certain specified course, for a certain specified measured distance, or along some previously established line, to some definite boundary, corner, or landmark, or along the margin of some stream, lake, or other natural boundary, or along some road, or street, from one fixed point to another, and so along the several sides thereof, which must be at least three, if the lines are straight, and may be many, to the place of beginning. It is important that these lines should be correctly run, exactly measured, and plainly marked, that no disagreement may arise, between adjoining owners, as to their exact location, as disputed boundaries are one of the most prolific causes of ill-will and litigation between neighbors. These boundaries once determined and the landmarks established, they may not be changed unless by the mutual consent of the adjoining owners, and a passing of title by a legal conveyance, and the law attaches a penalty for will-fully removing, destroying, or effacing any landmarks duly marked, set, or placed. Within the lines described in his deed, the owner has absolute control. He may clear it of timber, or leave it in forest. He may cultivate it, or leave it uncultivated. He may inclose it, or leave it uninclosed; but if his cleared land adjoin the cleared land of his neighbor, he must contribute one half of cost of building and maintaining a line-fence. He may call himself a farmer; yet it is entirely optional with him whether he shall grow good crops, poor ones, or none at all, and the only restriction put upon him by the law, in this respect is, that he must not allow certain noxious weeds to ripen their seeds upon his land, to foul the land of his neighbor. Aside from this, he may be just as good, or just as poor, a farmer as he chooses to be, may make his land, and all its appurtenances, a model of neatness and thrift, or an example of ugliness and slovenliness. At the line of his land, his authority stops, and beyond it he may not go, or he becomes a trespasser. On the other side of it, his neighbor is just as much an autocrat as he on his side. It was said by some ancient rulers, that they set their boundaries where they would by conquest. The modern land-holder, though he may crave possession of all the land that joins him, can only extend his boundaries by purchase. As no boundary, once duly established, can be varied without the owner's consent, so his title cannot be taken from him and vested in another, except by due process of law, founded upon his own agreement or obligation. His title deed, duly entered upon the record, guarantees to him that the grantor, not only "against himself and his heirs," but "against all other persons whomsoever, * * shall and will warrant and forever defend." Besides the lines thus briefly considered, there are others which no surveyor has run and no chain-bearers have measured, yet they are no less real and tangible than those whose location is marked by blazed trees, and attested by witness marks, and stakes and stones. They are the lines which divide, not the land, but the cultivators of the land, from each other. The classes into which the tillers of the soil might be divided by these perhaps eccentric lines, may be many; but for our present purpose only two need be mentioned. They are, first, those who have a genuine love for, and an abiding faith in, their chosen occupation. It is needless to add that this class does not include the majority, however much we may regret that facts warrant the statement. Secondly, those who follow it perforce, because they see no present door of escape from it, to some other which they imagine would be more congenial. The first are ready to say with the wise man: "Truly the lines have fallen to us in pleasant places, and we have a goodly heritage;" while the other class feel, if they do not express the thought in words: "Truly it is hard lines for us that we plod through all this drudgery, and find such meager reward for our toil." I believe that few farmers are willing to admit that the land on their side of the line-fence is more sterile or less valuable than that beyond it, in the field of neighbor A, or brother B. The farmer naturally feels a commendable pride in his own particular acres, and resents the imputation that his farm is not as good as anybody's. In fact, while he does not like to boast, and would be sorry to give offense, there is not a farm in the whole neighborhood he would trade it for, you know. But it is a fact that he is too apt to imagine that away beyond his farm, and his neighbor's farm—somewhere on the border of the domain which separates his occupation from that of the lawyer, the parson, the shop-keeper, and the printer, there is another line-fence, higher and stronger and closer from top to bottom than that described in the venerable "fence law of 1700," and that he is most unfortunately on the wrong side of that fence. He knows nothing by experience of the difficulties which beset those in possession of the fields beyond, but to his mind the sun always shines there, unless rain is needed; it is never too dry to plow, not too wet to plant, and no untimely frost ever cuts short the promise of a bounteous harvest. If he could only have the chance to till the fields of these fortunate ones on the other side, what crops of contentment and enjoyment he would raise. Thus "distance lends enchantment to the view," and the viewer pays an exorbitant rate of interest in regular installments of discontent. That the farmer and his family have some disabilities and disadvantages to contend with, need not be denied, as no pursuit or calling is exempt from them, but the imaginary line, so often drawn, which locates all the desirable things in life—respectability, dignity, usefulness, culture, and happiness—upon the one side, and the farmer upon the other, is a most absurd misleading and senseless division of things. It is not the purpose of the writer, nor would it perhaps avail anything should he attempt it, to point out to his discontented brother of the grand army of agriculture, the privileges, the immunities, the opportunities, and the blessings which he enjoys, or which are within his reach, because he is a cultivator of the soil. It may be some consolation to him to know that the line above referred to is nowhere visible from any high ground from the other side. Should he decide to quit the plow. and seek some other occupation, as many have done before him, he will find among his new associates, the brethern of his new guild and craft, many who are looking with aching hearts and longing eyes to the blue hills and the green fields he has left in disgust, and wishing that some fortunate turn of fortune's wheel would take them out of the noise and din of the shop, the pent-up walls of the counting-house, or from behind the bars of the bank, and locate them in a quiet rural home. It is not to be assumed that every one who is discontented with farm life ought first of all to learn to be resigned to what seems to him an uncongenial occupation. If he have a clear and decided preference for some other calling, it may be best for him to cross the line, and try his hand at the business he prefers. This process of adjustment is always going on, and often, doubtless, with beneficial results. So shall some of the crooked lines of life be made straight, and some of the rough places smooth. Happy is he who, in the morning of life, discovers upon what lines his inclinations run. Keeping upon this chosen course, he shall find all its metes and bounds run parallel with his desires, and all its toils and tasks, labors of love.

THOROUGH-BRED STOCK FOR THE FARMER.

An address by **Emery Davis**, *Member from Warren county.*

Some thirty years ago, when I commenced farming, I found that I could not market my hay and straw in any other way than by feeding them to stock. I found that certain kinds of animals consumed a great deal less food to finish them to a given weight than others, and I commenced reading up on the subject; and, after reading of the experience of Mr. Bakewell, I was struck by his course of raising stock, which led him to adopt a method of improving his breed of cattle. It is related of him that when he went to London with a drove of three hundred cattle and fifteen hundred sheep, that when he got there he sold his cattle by the score, and his sheep by the hundred, to the butchers. When he allowed the butcher to go into the herd and take the first score, he paid well for it; I do not now remember the price, but, for example, we will say a shilling a pound. When he sold the last score, they often did not bring six-pence per pound; or, in other words, the best of his drove brought him twice as much per pound as the poorest. This was repeated so many times in his experience that, when he was going home, and in talking of his sales to his neighbors, he was led to reflect that there was certainly something foolish in raising the inferior or lower-priced cattle. After he had reached this point, he was careful, in his purchases, to throw out all "culls," and to buy only such as, in his estimation, would bring the best prices in the London market. The next time he went into the Highlands to buy cattle, he purchased a good bull; he next bought a lot of first-class cows, and took them home with him for breeding purposes. He followed the same course with his sheep. In all cases, he selected his bulls and bucks from the man who sold him the best cattle, or who raised cattle, having the largest proportion of first-class animals. In four years after he commenced this systematic breeding, he was renting his bucks for two hundred dollars per year, and, in a few years more, was selling his stock at fabulous prices.

Reading of his experience in this line set me to thinking that it was better for a stockman to make his selection of breeding animals as Bakewell did his. I went to our fairs; I went to our State fairs, and to the State fairs of New York; I examined all the stock which I came across, and I soon noticed that there were certain animals which were much more profitable to farmers than others. The Short-horns were then fashionable, and I selected a first-class Short-horn (Durham) bull as a starting-point. My dairy of twenty cows was producing one hundred and sixty pounds per cow per year, beside the butter-milk and cream needed by my family. By the careful use of this bull in connection with these cows, I raised my average yield of butter per cow to two hundred and thirty-five pounds. I increased the prices of my cows, and my habit was to select my poorest cows for sale, and put on better animals each year, or at least at all times when a change of animals was made. I increased the value of my cows from thirty to one hundred dollars per head, all of which was due to the careful inspection of cows and bull, and yet it cost me no more to feed these better cows than it did the same number of the originial stock.

Mr. Russell, who is an old and experienced farmer of our county, (Warren,) gives me his experience of forty years ago about as follows: Four of them purchased a thorough-bred bull, (Short-horn.) They used this bull, and by the time he was four or five years old, he was able to purchase one on his own account; and, in 1860, he told me he had increased his farm from one hundred and thirty acres to two hundred and forty-four, and had eleven thousand dollars in bank, and attributed every dollar of it to the improvement of his stock, and the use to which he had thus put his hay and pasture. These reasons have led me to compare some statements that have been made before our Board in reference to the price of cows. By the purchase of one animal, I raised twenty steers each year for five years in succession, with no other feed than hay, corn-fodder, and pasture, and I sold them in the fall, at two years old, at an average weight of twelve hundred pounds. In traveling over our State, you will find nine tenths of the stock that we see that will not reach that weight. I sold them at from seventy to eighty dollars per head.

We read of butter-tests of other breeds, and these tests would not be valuable to the farmer, because the expense would be larger than the market value of the butter produced. Take the Jerseys as an instance; yet dairymen will persist in using common stock when good stock, that will produce from ten to twelve pounds per week, are within their reach. It shows that this thorough-bred stock, if properly utilized by the farmer, will increase his butter product in the same proportion that the Durhams did the beef product. Col. Buford, of Paris, Kentucky, when returning from a New York sale of blooded stock, was asked if he did not think that the prices obtained at the sale were far beyond the intrinsic value of the stock, or whether he thought the cow which brought thirty thousand dollars would ever pay back the price. He answered, "I am now seventy years of age, and, hence, am not a young man. When I was a boy, I inherited a farm that was capable of turning off one hundred steers annually, all raised from calves, and large enough to keep the necessary cows for raising this amount of stock. On this farm was a herd of cattle called "The Seventeens"—Long-horns, Hereford, and Short-horns mixed—and when Mr. Alexander went to England to purchase the first Duke, he looked at him, but he thought him too small. He afterwards purchased Duke." He says that when he commenced to use that class of animals he doubled his beef product. He said that he wrote to his broker, and wanted him to come down and purchase his two-year-old heifers. He came down, and he sold him two hundred and twenty from the same farm that produced one hundred—sold them at six and one half cents per pound, which amounted to over twenty-six thousand dollars for the lot. He said that the farm had more than doubled its beef product. "No; those cows were not sold at too high a price. Wherever any one uses that family of bulls, the beef product will be doubled. In traveling over the State of Pennsylvania, I have thought that if the people would use pure-bred animals, at an expense of only fifty or one hundred dollars more, they would more than double the beef product, with the same amount of provender and food. I say that with the experience of thirty years."

I will not say much about the butter product, because there are those here from our dairy counties who know more about it than I do; but I do say that the same principle, if applied to other breeds, will hold just as good with dairy stock, and that the butter product may be increased in a similar proportion.

High taxes and high rents in England compelled the farmers to look around and devise some means to make everything on the farm marketable. Their straw and chaff alone would not fatten stock, but used with turnips and a little concentrated food, they were enabled to fatten their cattle, and in this way they turned everything into money.

To illustrate the rapidity with which thorough-bred cattle will take on flesh, I would state that three years ago I turned a cow into pasture in May, with a weight of twelve hundred pounds. In September, she weighed sixteen hundred pounds, gaining, in four months, four hundred pounds. If thorough-bred cattle will do this, would it not be of benefit to every farmer to get some of the blood into his stock?

Cases similar to those which I have given can be found in every State in the Union, and more or less of their results are attainable by any one who will invest the necessary capital, and give the matter the requisite attention and care. A few hundred dollars is all that is required for a commencement, and the rest will slowly, but surely, follow. All cannot start with thorough-bred stock upon both sides, for that would cost too much; but this is not necessary, for, with thorough-bred blood on the side of the bull, and a careful selection of the cows, the work is easy.

WILL BETTER FARMING PAY?

BY JOHN I. CARTER, *Chatham*, *Chester County*, *Pa.*

[Read at Lancaster Meeting.]

Naturally, the answer to this question will be an affirmative one. Yet there are many farmers, who, if asked to do better farming, would assure you with much sincerity that they now labor all they are able, and that they now employ all the capital they can spare or command, without apparently dangerous risks. And when we consider the comparatively high price of farm labor and the low price of farm products—when we figure the cost and selling price of our main crops, we cannot wonder at this caution on the part of the prudent farmer.

It is natural that he should hesitate, when the praises of high farming, blooded stock, and improved machinery are sung in his ears. These all mean the employment of more capital, more labor, and more experience, and very properly should be introduced slowly, and with adequate caution. Anything like a radical change in a system of farming, or much of an innovation, like the wholesale introduction of blooded stock, or unusual applications of commercial fertilizers, or large purchases of new machinery, are all doubtful betterments, unless directed by sound judgment and thorough experience—more, perhaps, than the average farmer usually possesses.

But the farming of a community can be greatly bettered, in a way, too, that is entirely safe, by a closer attention to many of the minor details of farming that are too frequently overlooked or neglected, and although each neglect may be small in itself, yet their reform will aggregate a wonderful change in the appearance and wealth of a farming neighborhood.

Take, for instance, the improvements of our waste lands, (and probably three per cent. of the farming districts of Chester and Lancaster counties might be termed waste lands,) and quite a field for improvement will be presented. On the average farm will be found the unreclaimed swamp, the thicket of bushes, or the sparse and unprofitable piece of timber-land.

We pay taxes and interest on this unproductive land. It must be fenced, and receive more or less attention of some sort. It makes a harbor for vermin and a hot-bed for noxious weeds. It is an eye-sore to the traveler, and a waste of property. Often a little ditching will reclaim such a swamp, and make a valuable meadow of an impassable marsh. The grubbing-hoe and the briar-scythe, and a little fertilizer judiciously applied, will soon make the thicket a garden of productiveness.

It is wonderful how soon a little persistent cutting will kill out bushes and weeds that before had an apparent life-lease on the land.

How much comfort, how much neatness, and how much good grass, can be added to our farms by a thorough mowing of our fence rows two or three times a year! It is surprising to see how quickly the grass takes entire possession, and the after-labor of keeping them clean is comparatively light.

The fall mowing of weedy pastures and stubble fields is a profitable work. If the weeds are cut before the seeds ripen, we lessen future trouble with the weeds, and give the young clover and other grasses a chance of light and room, and enable them to make a vigorous fall growth.

The timber-lands on many farms can be greatly improved with trifling expense. A judicious pruning-out of worthless timber, and of trees and saplings that will never be valuable, and supplying their places with such timber-trees as the locust, the black walnut, basswood, or lindens, or some of our oaks, chestnuts, and pines. Most of these grow readily from the seed, and some of them are easily transplanted. The yellow locust is a rapid grower, and a valuable tree. Twenty years will make a remunerative crop of posts. It renews itself from suckers and root sprouts.

The black walnut is easily grown from the seed; is a good grower, and its timber increasingly valuable.

The oaks, chestnuts, and lindens are not less easily grown, but slower of growth.

If the timber-lot can be protected, and the young trees somewhat cared for, it is better to plant the seed where the trees are to stand. In this way many of our timber-lots can be made to carry twice the amount of timber they now do, and the trees be straighter, fairer, and more valuable.

Rocky knolls and steep hillsides that are hard to cultivate should be made to bear their crop of trees—not only yielding the farmer a better revenue for the land, but serving as wind-breaks, and hindrances to the fearful cyclones that are becoming too common for comfort. As important conservators of rainfall, and a source of safety against floods, and droughts, and the shrinkage of our water powers, the timber-lands of our country are yet too much undervalued. Every farmer should see that the spring-heads in his meadows are sheltered and protected by a garden of maples, cypress, or sweet gum, and he will find it a bit of better farming that will pay.

There is another source of frequent loss to the farmer that might be bettered. More care in putting in their seeds. We see farmers plow, and harrow, and fertilize with much care and patience, and then, with hoe and drill, and unwonted haste, perform the most important operation of all. If the seed is badly sown, with vacant spaces and unseeded spots, no after-cultivation can fully make amends. Many a corn-field has five to ten per cent. of missed hills, and at the end of the season, a proportionate reduction of the crop. If it is the grass seeding that is defective, the loss is still greater, for the crop extends over several years. Few farming operations pay better for persistent care than careful grass-seeding. If there is no grass, then you have weeds. "Nature abhors a vacuum." Worse than useless trash will mar the fields, deteriorate the quality of the rest of the crop, and make future trouble by a new batch of weed seeds. To sum up, a single way to farm better, and at the same time make it pay, is to give greater care to the smaller details of the business.

To gather up the "small ends," and to "make by saving," is a safe and sure way for the average farmer to farm better and make it pay.

AGRICULTURE AND FARM MANAGEMENT.

By Dr. WM. S. ROLAND, *Member from York.*

[Read at the Conneautville meeting.]

Agriculture is the art of cultivating the soil in such a manner as to cause it to produce in greater abundance and perfection, the vegetables and fruits necessary to sustain animal life. Although, on all parts of the earth, where climatic extremes do not make it absolutely impossible, the soil possesses a certain degree of fertility, so as to produce, in more or less abundance, plants suitable for the subsistence of man and beast; yet, without care and cultivation, that natural product, in many sections of the world, is meager in quantity, and often almost destitute of the nutritious qualities which only can be imparted to it by careful and intelligent cultivation.

In ancient times, the nomadic habits of the people led them from one portion of the country, of which they were possessed, to another, in order that their flocks and herds might subsist on the natural products of the soil; and, although agriculture was one of the first occupations of man, but little attention was given to that industry, and that of the most primitive and unsatisfactory order. So it has been among the savages of our own day and country; millions of acres, which, when under their control, produced but little that was life-sustaining, but, when cultivated by industry and intelligence, return to the agriculturist most abundant crops of cereals, vegetables, and fruits.

Wherever the plow, guided by the hand of intelligent industry, has broken and cultivated the soil, it annually returns a rich reward for acquired scientific knowledge, practically applied by patient physical labor. Yet, here in our rich agricultural districts, and most productive portions of our country, we too frequently see men engaged in the cultivation of the soil they own, or which they farm for others, totally ignorant of the most simple rules, which should govern all who desire to thrive by this old and honorable occupation. They apparently know but little about the formation and nature of the soil of the farm on which they expect to spend years of toil, in order that they may thereby gain a living. They buy large tracts of worn-out and neglected land, from the acreage of which they blindly trust to be able to win enough by poor husbandry to not only make a comfortable living, but to amass a competency for their descendants. They have no clearly fixed ideas of the rules that should govern their system of cultivation, in order to more speedily and effectually assist nature in rehabilitating their worn-out and unproductive fields, with a soil that would soon respond to the touch of intelligent husbandry by a return of most bountiful harvests. They often show most decided ignorance in the selection of their farms, as to the lay of the land, convenience of water, quantity of timber, and division of the farm into fields. They again display a most lamentable absence of any familiarity with the nature and quality of the soil they cultivate. They are equally as unable to understand how to treat wet and clayey soil, in order to render it sufficiently dry for cultivation, as they are to draw to the surface of dry and sandy soil that degree of moisture required by the crops growing on the surface. On the other hand, where intelligent, scientific knowledge of the nature and quality of the soil to be cultivated and recuperated go hand in hand with industry, the farmer will win from the improved soil the fruits of his labor with the first gathered crops. Hundreds of our young men who have been reared on farms, have reached the age of maturity through years of toil, and without having acquired that knowledge of the nature of the soil they cultivate, and the best means of improving it, which should be inseparably associated in the education of every man who selects farming as his future life-labor, and would prove a success in that occupation. One man, whose knowledge is thus limited, may toil on from year to year without making any appreciable improvement in the land he cultivates, or adding one bushel or pound to the crops raised by him the previous year; while his more scientific, although no more industrious neighbor, will add increased value to his land, and weight to his purse annually, by an intelligent cultivation of the same quality of soil. Nor is this all; for, when visiting the farms of the two men who have thus started side by side in the great life-battle set before them, you promptly recognize that farm cultivated and managed by the educated farmer from the one tilled by his neighbor, who blindly toils through the seasons, only to complain of short crops and hard times. The one shows unmistakable evidence of intelligent and thrifty management in the well laid out and clear fields, clean fence-rows, well filled barns, numerous stacks of grain and feed, cribs piled high with yellow corn, and sleek, well-bred horses and cattle; while on the other, the eye is outraged by the sight of barren and ill-shaped fields, almost run over with bushes and briars, dilapidated fences, empty barns and cribs, ill-fed stock, and a mass of broken and weather-beaten implements of husbandry, which have never been housed since the day they reached the farm. This comparison is not overdrawn, but is only a weak effort to point out the vast difference between intelligent husbandry and ignorant and careless farming.

Therefore, in order to make farming a success, the farmer must necessarily combine industry, care, and judgment, with an intelligent knowledge of the nature of the soil he cultivates, and the best system for improving the same, whether it be selected by his own choice or by the accident of circumstances. The reading farmer is taught by scientists that the surface of the earth is composed almost entirely of four substances; these, they say, are the decomposed rocks of a former period, called by them primitive earths, and are clay, sand, lime, and magnesia, a combination of which form the fertility of the soil. Clay, the first-named component part of this combination, is composed of a substance which is readily recognized by all. It absorbs water slowly, and hence can always be found acting as a reservoir for the water which gives the farmer so much trouble in the low lands of his farm, and practically destroys what would otherwise be most excellent meadow land, not only because it holds the water, but for the additional reason, that its tough or tenacious nature prevents the roots of cultivated crops from penetrating it, and this hindrance must be corrected by chemical process, or the land given over to bushes and sourgrass. But how to most successfully produce this change in the soil, is a question which has frequently troubled the minds of our most successful agriculturists. Most of writers on the subject agree that the change necessary to the improvement of clay soil can be best effected by applying to, and mingling with it, all kinds of calcareous (lime,) manures, ashes, street-sweepings, and barn-yard manures after which it should be plowed up in the fall, so as to expose it to winter frosts, which destroy and mellow its tenacious qualities. Sand, the next of the four primitive earths, is a soil of an entirely different nature from clay. It is not cohesive, and is, therefore, incapable of retaining moisture, and hence crops grown on a sandy soil often suffer from drought, as the moisture so readily escapes. Writers on this character of soil also differ as to the proper mode of treatment; most of them, however, agree that deep plowing, with a dressing of the heavy wet deposit from the barn-yard, with the black deposits found in swamps and along streams, are attended with good results. A further benefit to sandy soil results from allowing the small stones often found on the surface to remain, as they assist in retaining moisture, and are not in the way of crops or machinery. Lime, also one of the primitive earths, as a general and valuable fertilizer is too well known, even among the uneducated, to require any extended notice. Most farmers know lime to be a valuable and lasting fertilizer when properly applied to the soil; but, many desiring a more active agent for the production of crops, resort to the use of often expensive, and sometimes worthless, artificial fertilizers. The fertilizers in which dissolved bone is found in large quantities are considered the best. Bone, like lime; however, is not a very active agent, but is a lasting one; yet the difference in cost between lime and bone, and their relative effect, must be left to the judgment of the farmer. Magnesia, the fourth primitive earth, is not recognized as possessing any valuable fertilizing qualities.

A manuscript touching on this branch of my subject came into my possession many years ago, and which seems to have been written in 1835, in which the writer says: "The agricultural value of a soil depends less on the nature of the materials composing it than upon their relative fineness."

Plants draw a large portion of their nutriment from the atmosphere. The soil upon which they grow should be of such a texture as to retain a suitable quantity of moisture, and not be so clayey as to bake and crack in the heat of the sun, or so sandy as to become parched and mere dust at the depth to which the roots penetrate.

Argillaceous earths have a strong affinity for water, and retain a small portion when heated. There should be enough of this in the soil to enable it to retain three or four per cent. of water when dry, and to make the other materials into a loam. The substratum should always be taken into consideration, as well as the soil, and if it be sand or loose gravel, the soil, unless it contains a rather large portion of clay, is apt to be too dry; but if the sub-soil be clay, the soil will almost always be what is termed cold and wet. Where clay occurs, gravel and sand are often observed in alternating strata; advantage is often taken to drain wet soils, from a knowledge of this fact, by boring through the clay, so that the water above the clay bed can drain through into the sand or gravel below, whence it finds an outlet in springs at a lower level.

Sandy or gravelly soils are much improved by mixing clay or loam with them, and, on the contrary, clayey soils are benefited by a dressing of sand or gravel. Soils containing too much argillaceous earth heave by frost and draw the roots of plants and winter grain out of the earth, thus causing what is called winter-killing. The soil should be of such a texture as to allow the water in it to freeze, without making the earth heave or rise above its ordinary level. Who has not observed in such soils, on the approach of winter, when the ground began to freeze, that the stones of moderate size imbedded in them, which are ordinarily on a level with the surface, were then lower—in other words, the stone remaining fixed; the earth by freezing had risen above it." But getting back to my subject, in addition to the four primitive earths, which have been named as constituting the soil and sub-soil, the upper, or what is known as the mold, contains the decayed remains of vegetable and other fertilizing matter, which have grown and decayed thereon—as is the case on our great fertile prairies of the West, or have been fed to the soil from time to time in the process of cultivation. The decomposition of this matter is the cause of the fertility of the soil, and wherever that deep mold is found, the farmer will not plow and sow in rain. Then, if this be true, is it not the wise farmer who will carefully gather all vegetable matter into his barnyard, and there let the process of decomposition go on, until his soil is prepared for the crop, and then judiciously apply it to the land, in order to give life and vigor to the plants. The more manure of that kind, the larger will be the return to the farmer. At the meeting of the Indiana State Board of Agriculture in 1875, Mr. Thomas Olcott read an essay on grass and grain growing, in which, among other wise sayings, he said: "The main point is to make every rod of land on the farm available in raising something useful; good crops and increased fertility are the objects; manuring is the life of farming; the true idea of farming is to raise such variety of grains and grasses; of rich luscious fruit; variegated with the finest selection of stock and domestic animals, as will throw a charm around that spot called home." But how can this best be done? is the question that presents itself to the mind of every man selecting a farm for his future home. It is a question of easy solution, if every one engaging in husbandry will select for himself a farm of an acreage commensurate with his ability to cultivate it well, so as to improve the soil to the very highest state of fertility, he will be taking the first important step on the highway to prosperity. The man of abundant means may conveniently purchase a large tract of land, and by the proper use of money, judiciously expended on it, will bring it into a high state of cultivation. But with us a large number of our young farmers enter their chosen field of labor on the threshold of manhood with limited means, and often in doing so commit the grave blunder of selecting more land than they can profitably cultivate, and hence, more than they can pay for. One man selects a large tract of improved land, but, owing to his inability to hire the requisite amount of labor, purchase sufficient stock and implements to cultivate the whole in a workmanlike manner, that portion which must necessarily lie idle is nonproductive, and hence becomes a dangerous and continued stumbling-block in the way to success. On the other hand, the man who selects poor and cheaper land is in no better position, for he is compelled to meet an additional outlay in the purchase of fertilizing matter before he can harvest a single respectable crop. Nor is this all; for the man who owns and indifferently cultivates a large tract of land is compelled to meet many expenses which he would not encounter on a smaller tract, and from which he would reap the same returns. Why, for instance, should a wise farmer pay taxes and other heavy expenses on twice as much land as he can cultivate with profit? It is the small, rich, closely cultivated tracts that pay the farmer best. The productiveness of well-tilled land is almost unlimited, and if the careful farmer can grow thirty bushels of wheat, or one hundred bushels of corn, or forty bushels of oats, or two hundred bushels of potatoes, or three tons of hay, on one acre, when intelligently cultivated, would it not be the height of blind folly to go over three or four acres to gather the same amount of crops which can be raised on one acre? Suppose the farmer owns but fifty acres, six acres of which is timber land; on this small farm he could have eight acres in wheat, nine in corn, five in oats, two in rye, one in buckwheat, one in potatoes, seven in grass, seven in pasture, three in orchard, and one acre for house, barn and out-buildings, and garden. Here is all the variety of crops provided for, and, if highly cultivated, would feed the family and give a surplus for market, from which sufficient could be saved to apply to any necessary or useful purpose. In cultivating this small tract, the farmer would require the assistance of a stout industrious youth; he should keep two or three good horses or mules, mares would be most profitable, as they, if well cared for, would raise colts annually. He should keep four or five good milch cows, and raise all the likely heifer calves; he should also keep a few sheep and swine, and poultry, all of which should be good stock. Then, as the annual products of this small farm enable him to do so, he can produce additional land, and with the same care and industry, make farming on a larger scale as profitable as when he owned but fifty acres. But, in order to be successful in the way that has been here indicated, the man who takes to farming as an occupation must have brain, push, and untiring industry, or he must prove an unfortunate failure—a drone in the hive of busy workers.

Statistician Dodge, of the United States Agricultural Department, under the heading of A. burden upon Agriculture, says: "A mortgage is a blessing when it enables a poor industrious young man to secure a home and a profitable business, and to pay for it in sure and easy installments; it is a withering curse when it makes production dear and difficult, consumes a crop before it is made, and renders indebtedness hopeless."

FARMERS' BOYS.

By MRS. F. M. LEIGHTON, *Glenburn, Pa.*

[Read at the Scranton meeting.]

I am happy in being permitted to address you on another subject than the one assigned me in your programme; one more congenial, and suggested by a mother's partial fondness for a class in which you are all interested, but whose claims seem often to take a second place in the farmer's mind or in his plans of life, namely: "Farmers' Boys." By this I mean, not the farm boy, who works upon the farm to-day, on the railway to-morrow, or in some factory or the mines, but the farmers' sons, the boys who are in training for the business of farming, and who are expected to fill their fathers' places on the farm, in the family, and in the State.

You, brother-farmers, are so much absorbed in your business; your interests are so widespread and various; the rush of each season's business crowding so closely on the one that follows. The magnitude of the main work, and the numberless small items to be looked after, each one of which has a consequence not to be set aside; the melancholy scarcity of reliable help, which makes it imperative that not only the farmer's eye must be upon all the work, but his hand must often supply the motive power; the active enemies he has to contend with—enemies in the air, in the earth, and in the waters under the earth—all these give the boys a chance of being neglected, or, if large enough to work, of being crowded in the great mill whose slow grinding has crushed out of all fair proportions many a bright young life. Many noble boys, with perfectly fashioned bodies, and active, vigorous minds, have been, by long continued, unremitting toil, dwarfed and stunted in physical development and shut out from other channels, their whole mental activity turned to money-getting. Like the man in the great allegory, they go on raking straws all their lives, so satisfied with their muck-rake that the celestial crown of happiness and usefulness within their reach is unsought and unwon.

We believe in the wholesome influence of regular employment, in the beneficent effects which follow systematic, well directed work, but such employment never caused the bowed frame, the slouching gait, the untidy person, and sullen, lowering eye and brow of some hapless farmer boys. A sense of injustice has soured and embittered what, under brighter and better conditions, would have been a happy disposition, and marred what should have been a well rounded life. We wish for more consideration for the boys on the farm, alike removed from the exacting severity which wears out the hope and courage of the boy, or, what is worse, the foolish indulgence which fosters idleness, and, by a large allowance of pocket-money, opens all the avenues to temptation. The consideration which makes a confidante and companion of your son, which invites his confidence and takes an interest in his plans, will bear precious fruit in the near future, a hundred fold.

The hope of the world is in the farmer boys. Nowhere else are found the conditions so favorable to the growth and development of the truly great man. Here is the perfect situation named in the words of Ager, even the prophesy, "Give me neither poverty nor riches," with the sordid taint of the one, nor the cankering care of the other. For around the farm homestead gather all the golden chances for the pleasantest life in the world.

No foul miasmatic odors from filthy streets or unwholesome manufactories; but the fresh air of heaven is the farmer boy's inheritance, as well as the pure water of the well or spring. No poisonous liquid filtered through miles of unwholesome pipes or drainings from death-dealing sewage, weaken and undermine his constitution, but the small boy on the farm "groweth up like a tree planted by the rivers of water."

The pre-natal influences are here of the happiest kind. He does not inherit neuralgia and weak nerves. He comes not to cold arms, and a colder heart, which has been calculating for months how many weeks the new-comer would keep her from the society which is her life itself. The echo of her heart is what our first mother said, "I have gotten me a man from the Lord!" He is not condemned to the tender mercies of a hired nurse, and brought up on patent baby food, city milk, or soothing syrup. He drinks in tender love and human kindness with his mother's milk, and grows up by her side "a well spring of pleasure."

Inexpressibly sweet and pleasant is the period of the farmer boy's childhood. From morning till evening, in the free out-door air, he makes companions and friends of the birds and small animals, who grow accustomed to his presence, and lose their habitual shyness at his near approach. By and by he will begin to exercise his muscles in useful work, learning habits of order and method by the regular recurring duties of the day. His sympathies are drawn out by the helpless dumb animals which look to him for food and care.

I have seen a small boy, less than five years old, whose greatest delight was to go to the barn with the hired man before daylight in the winter mornings, to give the cattle food. He would dress himself with little cap and mittens all ready, and hasten to be first at the barn to greet, with his merry good morning, the old oxen, who seemed to know him, and, as he assured his mother, "Laughed when he gave them food."

At six years he goes to school, and, of course, knows his alphabet, and can read a little, but he is rather a trial than otherwise for the first year or two to his teacher. He loves not the confinement of the school-room, nor the bell which calls him from recess; but he loves to make dams in the brooks, to climb trees, to search for curious things, either plants or stones, or young animals in odd nooks. It is happy for the boy and his parents if there is a teacher on hand at this juncture, who knows the pleasant and interesting pathway to the temple of learning and knowledge, for when once his feet have fairly entered upon it, he will follow it with a zeal that insures success.

The winter is the season of the farmer boy's schooling, and the multifarious duties of the farm in the winter morning allow no dallying. He must swiftly go the rounds, and there is no fear of indigestion, even if he eats his warm breakfast hastily. He changes his clothes, for he will not carry the odors of the stable to the school-room. When our boy is ready for school, the season is apparent for the many pleasant things which have been said of the farmer boy being too large for his clothes. The suit he is dressed in was worn to church and Sunday-school last year, will do school duty this season, and be worn out, with many supplemental patches, in the garden, corn, and potato fields next summer. But our boy, with books and slate, is ready for school. He is careful of his slate, for it is covered with examples wrought out with much pains-taking last evening, and he only waits to kiss his mother and be off. She knows that he will be a credit to himself and her, and a thread of gold is woven into the hard pattern of the work that day.

There is another sort of farmer boy, who does not love his book. As bright and diligent in his farm tasks, the whole routine of school-life is irksome to him. He is dreaming of what he will do when he is a man—with a great farm, with fine horses, nice carriage, herds of cows, and flocks of sheep. When the call to class is sounded in his ear he is only half awake, and surely he drifts to the foot of the class. He gets through the term as best he may and welcomes with infinite joy the blue-birds and robins. Sweet is their song to him as, the sap of the sugar maple. You must give this boy a great deal of active work to do, work that requires skill and responsibility. Listen to his plans, sympathize with him, but require of him daily to spend some time in reading. Look to it evenings and rainy days that he has well-selected, pleasant books. Persevere till he has acquired a taste for reading, then he is safe. It sometimes takes long-suffering patience to accomplish this, but there must be no failure. The boy who will not read is a prey to temptation, and is in danger of becoming a bad, as well as an ignorant, man.

Give him books to the verge of extravagance. Biographies of great and good men will encourage him to go and do likewise. Poetry and standard works of fiction will do more to raise the head and shoulders of the plodding farmer boy than plenty of money in his purse without it. A few good papers and magazines are necessary to the outfit, and will fill the hours of leisure, and keep our boy abreast of the times. Above all, teach him early to study the sacred Scriptures, assured that if the law of God is in his heart, none of his steps shall slide.

We would have the farm-house made pretty and attractive. Within and without everything decent and in order—in full keeping with the sweet freshness of the fields and woods. But the fatal mistake has often been made by farmers, when the restless time comes, as it will come to most children. In a fond desire to make them happy, a new departure is taken in the line of house decoration. Following the advice so freely thrown out by most periodicals, following also the plans which look so irresistible on paper, the farmer soon finds himself in a maze from which there is no escape, except by borrowing on bond and mortgage. It seems a smooth and easy road at first, but soon becomes very up-hill work.

It was in lifting a burden like this that Lamartine cried out: "If time has wings, the interest of a principal soon to become due has the swiftness and weight of a rail-car." Like time and tide, it will wait for no man, and the boys must often leave the farm, where every tree and shrub is dear to them, and go to other kinds of labor, unwholesome or dangerous, which bring a quicker return. Give to your children all you can, work for them with a love that knows no stint, but borrow not, except as a forlorn hope. Debt has driven more boys and girls from the farm than the dread of hard work.

Much has been said, and wisely, upon the education of farmers' sons. Comprehensive courses of study have been marked out for them; institutions of learning have been founded for them; but it seems a mistake to send the young man away from the farm for four years, unless the studies and associations are such as will help him in the life he is to lead. Many a rich farmer, whose early life was marked by hardships, in mistaken tenderness, after years of costly preparation, has sent his son to college, and could have said, when receiving him back after graduation, like a father of recent times, "Lo! we have thrown our money into the fire, and there has come out this calf!" In these days of excellent public schools, convenient academies, and cheap books, there is no good excuse for ignorance.

The average farmer boy of twelve years will keep his place in his class, if he leaves school at April first and goes back at November, with the average town lad. And is there a break or suspension in his education? Lessons as interesting and useful as any in botany he learns in the growth and habits of plants, and the open page of natural history is ever before him. Above all, he is preparing to solve the great problem of learning to live—learning how to become a self-reliant, self-supporting man, thereby helping to balance, in the economy of life, the great multitude of incapables sent forth by our institutions of learning every year.

If the boy has a marked taste for letters; if he eagerly seeks after, and uses, all the means within his reach; above all, if he is willing to earn his scholarship, do not tie him to the farm till he breaks his tether; let him go with a blessing, and help all you can. Do not let him work himself to death while you are making costly experiments on the farm with new implements, fancy stock, reclaiming some waste places, either barren or boggy, or the numberless ways in which farmers love to spend their money. Your investment in this son's education will be a paying one; if he lives, he will do the world good, and honor you; if not, his memory will be a treasure incorruptible. unwasting, everlasting.

If your son has a strong desire for any trade or industry, though your heart's desire is for him to till the paternal acres, let him go. The hard work of the farm would be intolerable in discontent, and the habits and training you have given him will insure success in whatever business he will engage, whether in school or college, in merchandise, in the work-shop, or in any of the walks of life.

There is much hard work to be done in this world for which the peculiar training of our farmer boy has fitted him. Who so worthy to fill places of trust and responsibility as the one used to self-denial from his boyhood? The great work of temperance is to be carried on, not by the votes of women, but by their influence on the minds of the little boys. The woman whose vote would be worth anything will raise temperance men; men who will not sign a petition for a liquor-seller's license; men who will neither give nor take a bribe.

To the house-worshipping mothers, we have a word to say. We know how incompatible is our farmer boy with the perfect housekeeping, which is her soul's delight. She almost dreads his home-coming from the field. Of course he will wash his hands and face, but he has no time, is too tired to make much change in his toilet, and he has little reverence for the crazy quilt which adorns the sitting-room couch. Dear to the heart of a good house-wife is the spotless kitchen floor. All the old traditions tell of it, but much annoyance and sorrow have come from it. The corner grocery and village store has filled up the precious hours of many a bright boy, driven from home by the frown on his mother's face, who saw that the speckless purity of her idol was threatened. A young man, raised in this county, was heard to say that his idea of home was shivering on a door-mat, afraid to move lest he might soil his mother's floor, and his youthful idea of happiness was getting safely and speedily out of that house. Poor boy! In the wide world I fear he has found neither home nor happiness.

There is a great need in the boy's nature which must be met, and there is no safeguard we can throw around him like a full and innocent social life. Many a restless growing boy, feeling a necessity laid upon him to go somewhere, would not have dropped into the tavern if he had known just where to visit boys and girls, and be welcome.

you must make your home pleasant and attractive to the young people.

Cultivate a full and suitable circle of young friends, and make all such feel that they are looked for at your house, expected, and fully welcome. Do not be displeased if your son sometimes desires to shorten the day's labor to attend some festal gathering with which perhaps you have no sympathy, and grudge him not the national holidays. You never had enough of them in your young days, and in this respect, your last days may be your best.

It is sad to see the silent, quiet homes that a few years since were running over with the joys of careless happy children.

It is sad to see old men tilling their farms with only alien help, but the sons may come back. " There is hope of a tree, if it be cut down, that it will spread again, and that the tender branch thereof will not cease. Though the root thereof wax old in the ground, yet, through the scent of waters, it will bud, and bring forth boughs like a plant."

So the world-weary man, whose heart, grown dry in political strife and money-getting, as the dead root in the ground, may come back to life and freshness of feeling, with the dew and the rain of the blessed country life.

It may be, also, that the boy who went away from us in the bright sunlight with such confidence of success, has overtaxed his powers, or, in some inscrutable event, has fallen in the race, and will come back to us in the deep shadows, to be buried with our hopes. There is comfort and cure for sorrow in the cultivation of the soil. The sharpest sting of disappointment loses its point when we have no time to brood over it.

In constant occupation, close to the great heart of nature, we are comforted as " one whom his mother comforteth."

FARMERS' MISTAKES.

By E. M. TEWKSBURY, *Catawissa, Pa.*

[Read at the Bloomsburg meeting.]

When the Secretary of the State Board of Agriculture requested me to furnish an essay for this meeting I began to cudgel my brains for a subject, and I concluded there had been a *mistake* made, and I said to myself, *farmers* are continually making mistakes. So I put the two ideas together, and christened it, "Farmers' Mistakes."

That farmers make mistakes, and very many of them, is patent to the most casual observer, but that he makes *more* mistakes than others in the various avocations of life would be saying too much, perhaps. I shall not attempt a general and detailed discussion of all the mistakes mentioned by me, which are not merely theoretical mistakes, but such as a life of close relationship with the farm and actual occupancy of the same have led me to observe.

First. That of Birth. There seems, generally, a disinclination on the part of most persons to pursue the avocation in which they are born, and, if pursued, a continual desire to change; hence, I observe that in nine tenths of our farmers that it is a mistake that they were born upon the farm. Other scenes are more inviting—other walks in life more pleasant than the hum-drum of the farm; but as this mistake is an *accident*, I will not dwell upon it, but pass to another mistake.

Second. Educational Mistake. Here the field is so wide that it is with fear that we enter, and being nearly allied in their results with birth, hesitate in making a proposition. If true, that "'Tis education forms the common mind, and as the twig is bent the tree's inclined," then especially the early education of the child should be that which will be of the greatest use in after-life upon the farm. Just here the great mistake is made. The father says, "*John* is to be a farmer, *he* must have the education a farmer needs, *he* must know how to read, write, and cipher, and these are enough for him to know." Chemistry, philosophy, geology, astronomy, law, and theology are untaught. It is a mistake to presume a man, a farmer, is to occupy a position he is unfit to fill. It is a mistake to presume a man is fit to make laws who has no knowledge of law, and while *law* is presumed to be common sense codified, yet it requires something besides common sense to put it in codified form. I am supported in this by Fully, Coke, and Blackstone. The ills of which we, as farmers, mourn and complain will have a speedy end when we are fitted, by a proper education, to stand and intelligently combat the evils arrayed against us. That an education which does not fit a man for the practicabilities of life should be given, should be withheld from the youth, is the farmer's great educational mistake.

Third. The next great farmer's mistake is, that of marriage; not that the marital relation is an improper one, but, on the contrary, one of the most important and honorable. God said in the beginning: "It is not good for man to be alone." Hence, the gift of a wife to the first farmer, Adam. Had not Eve been the direct gift of God to Adam, I should have supposed it had been a great mistake upon the part of Adam in making the selection. Any farmer makes a mistake that attempts to carry on a farm without a wife. If that is true, then there is great danger of making a mistake in the selection of a wife. Allow me to dwell upon this mistake of farmers at some length, for if a mistake is here made, it is a life mistake. The future weal or woe of life to the farmer, in the main, depends upon the selection of a wife. It is a mistake for a farmer to marry a woman who is not fitted for the important sphere upon which she enters. I know most women are *able* to raise *Cain;* but that does not alone fit her for a farmer's wife, more than it did Eve upon the first great farm. The farmer's wife should be one that loves farm life, that enters with zeal into all the minutiæ of farm work and management. Must be one that will be a help-meet, as well as a help eat. It is a mistake for a farmer to marry for appearance only, one that is fitted for dress and dress parade; and whose material only fits her for a belle. The culinary articles of the household are not of *bell* (e) metal. As the farmer's life is one of toil and anxiety, it behooves him to select a life partner, a wife who can aid him in his arduous labors, who can give that sympathy so much neeeded in his hours of disappointment, grief, and loss. The farmer makes a mistake in marrying a wife for *work* only. The wife should be a *manager*—a *director*—not only of the household, but, if necessary, of the farm. Had Eve attended strictly to the duties of Adam's farm, instead of gossiping with her neighbors, or some fruit-tree agent, strolling about the country, his affairs would have gone on more prosperously. It is a mistake for a farmer to marry a woman, no matter what her qualifications otherwise are, if she be devoid of moral principle. The wise man said: "Who can find a virtuous woman? (wife) for her price is far above rubies. A virtuous woman is a crown to her husband; but she that maketh ashamed, is as rottenness to the bones." It is a mistake to establish a home on any other foundation than that of virtue, morality, and Chritianity. Out from the hearthstone, and the mother's and farmer's wife's influence, have gone the sons that have swayed the destinies of nations. Everywhere we find them, wearing alike the clerical robes, and the judicial ermine, sitting in executive chairs, and moving in legislative halls. The farmer's wife, isolated from the degenerating influences and vices of society, so-called, if a woman of worth, is able to impart such instruction to her family as will tell upon the ages following. I will repeat, it is a mistake for a farmer not to marry; and, in my opinion, a great mistake not to marry young; or, rather, it is a mistake for a farmer to wait for *father and mother to die*, and himself settled in the world, before he becomes a married man. Speaking of being settled in life, leads me to another proposition that farmers make.

Fourth. Mistake in Location. But, if the farmer has been born amid favorable surroundings, such as conduce to a love of farming; has received an education that fits him for a farmer and proper member of society; if he has married early and well, then the location of the farm, if mistaken, may be, to some extent, overcome if properly cared for; hence, will not dwell upon mistaken locations other than to say that when once located—settled—it is better to stick to the farm—to improve it—than to make the mistake of continually moving. Other things being equal, nothing but unhealthy location should cause him to move.

Fifth. Mistakes of Management. To my mind, the leading mistakes of farmers under this head are four in number, viz: (1) *manuring*, (2) *tillage*, (3) *marketing*, (4) *fencing*. That either of the four mistakes named would be sufficient to base an essay upon, I am fully aware, therefore shall not call attention to the more general mistakes of each, without a particular discussion of all. The Vermont Yankee, upon his death-bed, called his son John to his bed-side and said: "John, *never; no, never*, go in debt." But, I suppose, thinking, perhaps, that he had made a farmer's mistake, modified the injunction by adding: "John, if you do go into debt, buy manure." The father certainly made no mistake in saying "buy manure" to the young farmer. It is a mistake for farmers (1st) to pursue the same course of manuring that farmers of years gone by pursued; (2d) to depend solely upon the same manurial sources that the farmers depended upon when the soil was in virgin state. The old and mistaken plan was to depend solely upon barn-yard manure and lime, plowed down *deep* for the roots of plants to work upon. A greater mistake was never made upon the farm than just this—not in applying the *matter*, especially the barn-yard manure, though I do doubt some as to lime, but the *manner* of application. Common sense ought to teach the farmer that it is a mistake in raising most, if not all, farm crops, not to apply the manure to the *plant* rather than to the roots thereof. (Same as applying bread and milk to the child's feet rather than to stomach.) It is a mistake to *purchase* manure when the farmer has a supply at hand that might be made available. Farmers make a mistake in not buying largely of commercial fertilizers, to be used in connection with barn-yard manure or alone; some fertilizer rich in phosphoric acids—plant-food. Farmers make a mistake in tillage, or, rather, non-tillage. It is a mistake to drive over a field with a team and plow and call it farming; it is a mistake of the farmer to plow but *once*, for fall crop especially; it is a mistake to plow but once, and then late in seeding season, and sowing immediately thereon. Farmers make a mistake when, by proper manuring and thorough tillage, they have raised a crop, to improperly market it. It is a mistake to rush upon the market the surplus of the farm; it is a mistake of the farmer to market his products *dishonestly*. The farmer makes a mistake in not giving full value in all products sold; it is a mistake not to give full weights and measures, not only to his success as a farmer, but also, for it hath been written: "A false (weight) balance is an abomination unto the Lord, but a just weight is his delight;" it is a mistake for a farmer, in marketing all products of his farm, stock included, to sell it for anything *besides just what it is*. If a horse is vicious, sell it for such; if a cow is a miserable kicking brute, sell her for such. It is a mistake for a farmer to consider it *sharpness* to improperly market his products, when *dishonesty*, downright knavery, is the proper word to use.

I come now to consider the longest, crookedest, and most of it, mistake so far as management is concerned of all the multiplied angular and triangular mistakes of the American farmer, viz: Fencing. It is a mistake for a farmer to have *poor* fences. It is equally a mistake to have *too many* fences upon the farm. The common law presumes that the owner will take care of his own; that he will fence *in* rather than *out*. One of the mistakes made by the farmer is that he fences against "all the world and the rest of mankind," without due regard to his own rights or needs. If the common law presumes each and all to take care of his own, then it is certainly a mistake for the farmer to fence against the host of marauding, thieving stock set afloat upon our highways to pasture and pillage. And, also, a great mistake, not only for his own good, but the good of others, that he does not build a good and sufficient fence to hold all such stock and treat them as *strays* under the act of Assembly in such cases made and provided. It is a mistake for the farmer to complain of taxes and tariffs, or lack of tariff, when the most burdensome tax is the fence tax, caused by dividing the farm of, say, a hundred acres, into a dozen fields. Less fences, less fields; less fields, less pasturing; more stall and yard feeding, and more barn-yard manure; more manure, more grain crops and stocks; consequently, more cash; and, as "money makes the mare go," so by the farmer having less fences he is able to ride a fast horse if he likes. This leads us to make another proposition.

Sixth. That farmers make a mistake in the kind of stock and quality kept, and manner of its disposal. This proposition I shall not discuss, as it has been so fully considered by others, except as to disposal of surplus stock. The farmer makes a mistake in sending to the *shambles* a superior animal, when, by selling it at the same rate to his brother-farmer, he could perpetuate and multiply its species. This may not be a financial mistake to the *stock raiser* and seller, but certainly it is a great moral mistake, as it is a violation of the Golden Rule. It is a mistake for the farmer to withhold from his fellows his surplus at a reasonable compensation rather than hold for speculative purposes.

Seventh. Farmers make mistakes in not coöperating for their mutual benefit—socially, morally, and politically. Coöperation is a subject illy understood by the American farmer. Some faint idea of its import has, of late years, been imparted to the people, but as yet they know nothing of it comparatively. Coöperation, as defined by Webster, "is the act of working or operating together to *one* end; joint operation, concurrent effort of labor." That the farmer does not do that which Webster defines coöperation, is patent to the most casual observer. They make a great mistake in not operating together to one end; no matter whether that be a political, financial, moral, or educational end. An army united, unbroken in ranks, is hard to be routed, but, once divided, it is easy to punish in detail; so, with the American farmer, operating singly, however worthy the object, and however much to the interest of the farmer and the country, his plans are easily thwarted; but, when operating together to one end, they are a power, known and felt.

It is a mistake for farmers not to coöperate in political affairs. It is a mistake for farmers not to be well posted in the politics of the country, and to make their knowledge known and felt by the political parties of the country. It is a mistake for the farmer to allow himself to be led to the polls, like sheep in the shambles, to do the bidding of the masters and bosses. Let the motto of the American farmer be that "the spirit of the Puritan fathers still animates their descendants, demanding political and religious liberty to all," and that we may be inspired, as were "the heroes of the Revolution, immortalized at Lexington, Concord, and Bunker Hill, and will inspire their children to resist injustice, monopoly, and wrong." It is a mistake for the farmer to presume that coöperation can be effected by any other means than by *organization*. The world's history is replete with the fact that organization is the key of success.

With an organization, coöperation is easy and possible. It is a mistake for farmers to exclude from their organization *all* who are not farmers in the sense generally implied by the word farmer in America. The farmers' organization should take in every element of society that will conduce to the success of agriculture; hence, the great mistake of organizations that do not recognize women as a part and parcel of their organization, for woman more, if possible, than man is interested in that which makes a home, and nowhere can, perhaps, be found a higher type of home-life than exists beside the hearth-stones of the farmers of our glorious land.

The last mistake of which I propose to speak at this meeting is that of diligence. The wise man said, "Seest thou a man diligent in business; he shall stand before (governors) kings, and not before mean men." "He that tilleth his land shall have bread, but he that followeth vain persons, &c., shall have poverty enough." Benjamin Franklin said if a man would have his farm (shop) keep him, he must keep his farm (shop); hence, I argue that it is a mistake for a farmer not to be diligent in his business. The Psalmist had this idea when he said, "Look well to the state of thy flock and herd." What other business more than the farmer's needs the watchful care of the Master?

America's great Solomon (Dr. Franklin) said: "He that by the farm would thrive, must himself hold the plow or drive." These high authorities presume that the husbandman particularly shall be a man attending strictly to his business. As the farmer's income is from comparatively obscure objects, it requires close attention to business. Is there a farmer in the sound of my voice but that notes with regret some misspent time, entailing a loss of property? It may be claimed that the Psalmist had *all* businesses in view when he spoke of the "*diligent* man's hand bearing rule," and the "diligent man's hand making rich," but he most certainly had the farmer in view when he said, "I went by the *field* of the slothful, and by the vineyard of the man void of understanding, and, lo! it was all grown over with thorns, and nettles had covered the face thereof, and the stone wall thereof was broken down." "Yet a little sleep, a little slumber, a little folding of the hands to sleep, so shall thy poverty come, as one that travaileth, and thy want as an armed man." The American farmer—especially the Pennsylvania farmer—to be successful must be diligent, not slothful, laboring with his own hands, for the promise of the Great Master is that "the husbandman who labors shall first be partaker of the fruits." A word by way of explanation and I close.

These thoughts have been arranged hurriedly, and in moments snatched from labor, but not with a view of being captious or fault-finding. "It is human to err—make mistakes." I have always disliked looking upon the dark side of any subject, but, as I grow older, I can find we can *best succeed* by making a careful note of our mistakes, and by avoiding them in the future.

THE FENCE LAWS OF PENNSYLVANIA.

By Hon. GEORGE W. HOOD, *Indiana, Pa.*

An address at the Conneautville meeting.

It was a fundamental principle of our law that every man must keep his cattle on his own land, and if they strayed away on to other people's grounds, he was liable for any damage they caused by the trespass.

At common law, it was necessary that every man should keep a constant watch over his animals; or, if he did not do this, to surround his land with a fence. The first and primary object of the fence was to keep his own animals in, and *not* to keep other people's out; and if any land-owner kept cattle, he was bound to erect a fence around his entire close, whether his neighbor kept any cattle or not; but, of course, the same rule applied to his neighbor, because, if *he* kept any, he must, also, surround his farm with a fence.

But it was discovered that two parallel fences would be useless, and would be attended with very considerable expense; and as one and the same fence would answer for adjoining proprietors, it was provided by statute, March 11, 1842, "That when any persons shall improve lands adjacent to each other, or when any person shall inclose any lands adjoining another's land already fenced in, so that any part of the first person's fence is between them; in both these cases, the charge of such division fence, as far as is inclosed on both sides, shall be equally borne and maintained by both parties."

By the same act, the auditors of the respective townships were made fence-viewers, whose duty it was, within four days after notice given, to view and examine any line fences, and to make out a certificate in writing, setting forth whether, in their opinion, the fence of one which has already been built is sufficient; and, if not, what proportion of the expense of building a new, or repairing the old, fence should be borne by each party; and they should set forth the sum, if any, which, in their judgment, either one ought to pay to the other, in case he should neglect or refuse to repair or build his proportion of the fence—a copy of which certificate it was their duty to deliver to each of the parties; and, if any of the parties refused or failed, within ten days after a copy of the certificate of the viewers had been delivered to him, to proceed to repair or build the fence as required, the party aggrieved had the right to build the fence and bring suit against the delinquent party for value of the same, before any justice of the peace or alderman, and recover, as in action for work, labor, service rendered, and materials found.

It follows, therefore, that if any adjoining owner does not keep up his half of the partition fence, and my cattle got through and injured his crop, he has no redress against me, since his own neglect was, in part at least, the cause of his injury.

But, at common law, if my cattle escape through my neighbor's defective fence, and stray upon the lands of another, and there injure his crop, I am liable in damages to him, though my own half of the fence is good, because, so far as third persons are concerned, I am bound to keep my cattle on my own land; and, if I have any redress at all, it is against my neighbor, who failed to keep up his part of the partition fence.

At common law, also: If I turn my cattle into the road, and they wander upon the lands of another, or if some careless person, crossing my farm on a hunting or a fishing excursion, leave down my bars, and my cattle escape into the highway, and thence into my neighbor's grain-field, I am liable to him the damages they may cause. On the other hand, if you are driving your cattle along the road, and, without any fault of yours, they run upon the lands of another, and you drive them out as soon as you can, you are not responsible for the damage done, because you had a right to drive them along the highway, and if you exercised proper care and attention, you could do no more. The *law* recognizes a difference between being *lawfully* and *unlawfully* on the highway.

The common law is, as I have stated, that every man is bound to keep his cattle on his own land; and this *would* be the rule in this State, except for the acts of Assembly imposing duties upon land-owners other than those of the English common law.

Under the provisions of the act of 1700, the owner of cattle is held liable for all damages caused to the owner of inclosed land, if he fenced according to law, and it has been held by our highest court that. unless improved lands are inclosed by a fence, the owner is in default, and cannot maintain trespass for damages by roving cattle; and the owners of improved lands must fence them, both to restrain his own cattle and to shut out the roving cattle of his neighbors. (*Vide* Gregg *vs*. Gregg, 55 Penna. State Report, page 227.)

In Pennsylvania, the law requires the fence to be "at least five feet high, of sufficient rail or logs, and close at the bottom." And to entitle a farmer to recover for the damage done by stray cattle, it is only necessary that his fence be such as men of practical knowledge and experience would consider sufficient to protect the crops from injury by orderly cattle.

If adjoining land-owners agree not to make any common division fence, each is liable to the other for the trespass of his cattle; but where a fence has stood for twenty-one years, one of the owners cannot remove it without the consent of the other; neither has he any ownership in the materials of the part erected by himself; and where one party unlawfully removes a portion of a partition fence and sets it upon his own ground, this does not authorize the other to fence up to it on his neighbor's land. Neither can one of the owners of adjacent *unimproved* land call upon the other to contribute to the charge of a division fence. The duty to maintain partition fences exists where both parties improve their lands. It would certainly be unjust to make a man whose lands are in woods and not improved, and on which he raises no crops, to pay expenses of maintaining and building a fence which can be of no possible benefit to him. *Hence* the policy of our law to compel those *only* who are benefited by the fence to either build it or be liable for delinquency in not building it.

Aside from this, however, no man is compelled to build or keep in repair a partition fence on the line between him and his neighbor. If he prefers it, he can have his own fence, but he must put it on his own ground, and maintain and keep it in repair at his own expense, and if cattle break through his close and enter upon the lands of another, he is liable for the damage they do. So, on the other hand, his neighbor can have his own fence also, but he, too, must build on his own ground, and will alike be liable in damages if his animals break over his close.

If a division line between two farms passes through a wood-lot, neither of the owners is obliged to erect a fence; but if either owner allows his cattle to pasture in the woods, he must not let them pass the boundaries of his own land, or he will be responsible.

As to fences along the line of railroads, the law is somewhat different. A railroad company is not bound to fence its road, and it is not liable to owners of stray cattle killed thereon. *Neither* is a railroad company liable for value of cattle killed on its track, although they escape from a properly fenced inclosure, without the knowledge of the owner, and were killed at the intersection of a public highway. And when a railroad company, in purchasing the right of way, binds itself to fence the road through the other party's land, but neglects to do so, if the cattle of the latter stray upon the track and are killed, the owner cannot recover for the injury in an action for the wrong or injury done. His only remedy, if any he had, would be on his contract, to recover the loss of his cattle. Railroad companies are not bound to pay for losses, unless incurred by actual negligence, and if cattle *unlawfully* stray upon their track, and are killed, the owner must suffer the consequences, because he should have kept his cattle on his own lot, and not allowed them to stray away upon other lands.

It is, perhaps, proper for me to observe that it has been contended in some of the States of the Union, that the common-law rule does not, and never did, apply to them. That the American common law, founded upon decisions recognizing the customs, which was the result of a condition of things quite different from those which existed in the mother-country, had established the converse of the rule, that the owner of cattle must fence them in; that the common law of England was only adopted so far as it was applicable to the new State; that, as far back in the past as the rule itself can be traced, land in England was inclosed wherever cultivated; that inclosed fields and tracts of land were the rule, and open land the exception, whilst in America the opposite condition of things existed.

But, from the beginning of the settlements in America by our forefathers, it was a well-recognized necessity that he who cultivated lands must protect his crops from trespass, whether from wild or domestic animals, by proper fences.

The common law is the basis of our jurisprudence only so far as it is applicable to the condition of society in the State by which it is adopted; and whilst it remains difficult, from the American cases, to deduce an invariable rule as to the applicability of this common-law principle that the owner of animals must keep them inclosed, and that there is not only a lack of harmony among the courts of all the States upon the proposition, but, in some instances, the decisions of the courts of last resort in the same States are at variance one with another; yet, in our own State, I think that the Supreme Court in the case of Gregg *vs.* Gregg, reported in 55 Pa. St. R., page 227, which is a ruling case on the subject, and which seems to be regarded as the law up to the present time, is sufficient warrant for us to say that, in the absence of any statutory provision, the common-law rule would be in force in Pennsylvania.

A careful examination of the fence laws of a large number of States in the Union shows that many of them are no better off than we are, many of the laws enacted being very similar to our own.

In Alabama—All fences must be five feet high, and strong enough to turn stock.

In Arkansas—The sufficiency of any fence may be determined by viewers summoned to examine it.

In California—A fence of stone, four and one half feet high, and of other material, five feet high.

In Connecticut—A rail fence four and one half, or a stone wall four, feet high.

In Delaware—Good fence four and one half feet high, of wood, stone, or well-set thorn hedges or ditch.

In Georgia—Worm fences or ditches must be five feet high, or deep, as the case may be, and other fences same height.

In Illinois—Walls, ditches, or fences five feet high, and sufficient to inclose and restrain sheep.

In Indiana—Any structure in the nature of a fence, which is such as good husbandmen generally keep, and shall, on the testimony of skillful men, appear to be sufficient.

In Iowa—A three-rail or board fence, with posts not more than ten feet apart where rails, and eight feet where boards, are used, or any other fence which, in the opinion of the fence-viewers, may be deemed equivalent thereto.

In Kansas—Post, or boards, or rails, hedge, ditch, palisades, post and wire, at least four and one half feet high, and sufficiently close, or stone walls at least four feet high.

In Kentucky—Every strong, sound fence, five feet high, and close enough to restrain stock, or a stone wall four and one half feet high.

In Maine and Massachusetts—All fences four feet high, of rails, boards, timber, or stone walls, in good repair and sufficiently close to turn stock, or such other fences as the fence-viewers deem equivalent.

In Michigan and Minnesota—The statute is the same, except that the standard of height is four and one half feet.

In Mississippi—All fences five feet high, substantially and closely built of plank, pickets, or other good material, or hedges sufficiently strong and close to exclude domestic animals of ordinary habits and disposition.

In Missouri—Fences sufficiently close to restrain domestic animals, five feet high, of posts and rails, or palisades, hedge or turf, or worm fence with corners locked by strong rails, posts, or stakes.

In Nebraska—A rail fence, six rails high, post and rails or boards; three rails or boards one inch thick and at least five inches wide, or post and four wires, (No. 9 wire,) and all at least five and one half feet high, or the fence called "Warner's Patent," four and one half feet high.

In New Hampshire—The same as in Maine and Massachusetts.

In New Jersey—All fences are lawful, which, being of post and rails, timber, boards, brick, or stone walls, are four feet two inches high; all other fences four feet six inches in height, and so close as to prevent horses and neat cattle from going through or under the same, and partition fences between improved lands must be close and low enough to turn sheep.

In Rhode Island—A hedge with a ditch three feet deep, a hedge without a ditch four feet high, a stone wall four feet high, and all other kinds of fences four and one half feet high, in good repair, and sufficiently close.

In South Carolina—All fences strongly and closely made, of rails, boards, or posts and rails, or line hedges, five feet high.

In Tennessee—A sufficient fence, five feet high, and so close from the earth as to prevent the passing through, or under, of hogs.

In Vermont—Similar to that of Maine, except the standard of height is four and one half feet.

In Virginia—Every fence five feet high, well built, and sufficiently close and near the ground to restrain horses, cattle, sheep, hogs, and goats.

In New York—The statute leaves the whole matter of the character of the fence to be determined by the electors of each town at town meetings.

In North Carolina—Similar provisions leave the matter to the determination of the voters of the several localities, in elections duly held, except that there is a general statute, by the terms of which each planter is compelled to protect his cultivated fields by a fence at least five feet high.

Thus it will be seen, by the hasty examination of the fence laws of some twenty-seven States in the Union, outside of our own, that various kinds of fences are authorized by statutory regulation, the more liberal being in the Western or new States, and thereby making legal any kind of a fence which would serve to keep domestic animals within the inclosure.

The Pennsylvania Legislature of 1885 was doubtless in favor of repealing the act of 1700, but the bill coming before the House asking for its repeal as to but one county in the State, naturally drew forth more or less opposition from those counties opposed to its repeal, and the final result was, which was brought about by an amendment to the bill, that the provisions of the act of 1885, repealing the act of 1700, should not apply to any county in the State, unless the county commissioners request the sheriff to publish the act therein, with, and in the same manner, that notices of the next general election shall be published; and for the purpose of ascertaining whether or not the provisions of the act are deemed expedient and desired in such county, and the qualified electors shall determine by a vote thereof, whether the act shall take effect in such county.

Whilst this provision in the act puts it in the power of any or every county in the Commonwealth to repeal the act of 1700, so far as it relates to such county, yet practically the law *is* not and *will* not be repealed. The very thing intended to be accomplished by the act will not be attained. County commissioners will not take upon themselves the responsibility of requesting an election, and when an election is held, the various notions and prejudices of the people regarding the old law will enter into their actions at the polls, and, in a majority of instances, the law will not be repealed.

The act of 1700 was passed when our country was new; when it was much more difficult to fence than now, and when cattle roamed at large through every woodland and forest, wherever pasturage could be obtained. The act was only passed for the benefit of the "provinces and the counties annexed," and it has *certainly* long since outlived its usefulness.

It seems to me that if the act of 1700 was stricken from our statute books, and the common law rule in force in our State, that every farmer must fence his land to keep his cattle in, or be reponsible for the damage they may do, that it would be much better than with the act in force. The law as to partition fences remaining the same, the farmer would be at liberty to build any kind of a fence that would keep his cattle within his own close.

THE FENCE LAWS OF PENNSYLVANIA.

By Hon. HENRY M. SEELEY, *of the Twenty-second Judicial District of Pennsylvania.*

Read at the Honesdale Meeting.

I have been requested to speak, not upon the fence laws of Pennsylvania in general, but only upon a single feature of those laws.

In June, 1885, the Legislature of this Commonwealth passed an act repealing the first section of the act of 1700 relating to fences, and providing that this repealing act should not take effect in any county until it has been ascertained that the provisions thereof are deemed expedient, and desired therein, by an election to be held as therein directed.

I was invited to say something to you with reference to this act, and its effect in counties where it might become operative.

The duty to maintain line or partition fences is no part of the subject-matter of the section to be repealed, and is not presented for our present consideration.

I purpose, in a rapid review of the history of this subject, to inquire as to the common-law rule regulating fences; under what circumstances, and when first, a different rule came into effect; following the course of the legislation upon the subject in the Province and State of Pennsylvania; considering what portion of the first section of the act of 1700 is now in force, what it accomplishes, and what change would result from its repeal.

The very idea of separate ownership of land implies exclusive right of possession. No other person may enter upon it without the owner's consent; hence it is said that every man's estate is encircled by an ideal or imaginary fence, reaching from the surface upward to the heavens, and downward to the center of the earth.

Every man is bound so to conduct himself not only, but so enjoy his property, as not to injure that of another. So it was that if one permitted his cattle or his servants to trespass upon the lands of another, he must respond for all damage done. The ideal fence erected by the law was, in theory, as secure a protection as any actual fence could have been.

The first law governing this question, to which I direct your attention, is found in the Second Book of Moses, commonly called the Book of Exodus, in the twenty-second chapter and fifth verse, as rendered in the newly revised version, where we read:

"If a man shall cause a field or vineyard to be eaten, and shall let his beast loose, and it feed in another man's field, of the best of his own field, and of the best of his own vineyard, shall he make restitution."

This was the common law of England. The duty was upon the owner of cattle to restrain them from injuring his neighbor; not upon the cultivator of the soil to protect his crops against his neighbor's cattle.

In England, this general rule was subject to qualifications in its application. Sometimes, by prescription, a man became charged with the duty of maintaining a fence around his field. (See Coke upon Littleton, 283.) Sometimes Parliament, in providing for the division of common lands, directed how and by whom fences should be maintained. (See form of plea averring such an act in Wentworth's Pleadings, vol. 8, pp. 36–37, &c.) Whenever, in any way, the individual became responsible for maintaining a fence about his own field, he was not permitted to recover against another damages which could only occur by reason of his own neglect to maintain his fence.

This protection, which the common law furnished land-owners, seemed exceedingly burdensome to some of the early settlers of the American Colonies. Cattle were permitted to range at pleasure through large tracts of unimproved land, cultivated fields were comparatively small, and the custom arose of settlers combining to inclose in common, by one exterior fence, lands for cultivation, so protecting them against the danger of injury from wandering cattle.

This was a reversal of the common-law rule, and substituted a material for an immaterial fence around cultivated fields. Originating in the voluntary act of neighbors, it came to be recognized and regulated by law, and was the first step toward the compulsory fence law as we have it to-day.

When first it was so recognized and regulated, I do not know; but in 1664, in a digest prepared under the authority of His Royal Highness, the Duke of York, of laws "collected out of the several laws now in force in His Majesty's American Colonies and plantations," we find the following:

"Every person interested in the improvement of common fields inclosed for corn or other necessary use, shall, from time to time, make and keep his part of the fence sufficiently strong and in constant repair, to secure the corn and other fruits therein, and shall not put, cause, or permit any cattle to be put in so long as any corn or other fruits shall be growing or remain upon any part of the land so inclosed, unless by some general expressed agreement of such as are interested." (Duke of York's Laws, p. 15.) Also the following: "And when lands lie in common, unfenced, if one man shall improve his land by fencing in several and others (one or more) shall not, he who shall so improve *shall secure his land from other men's cattle*, unruly cattle excepted, who shall compel no man to make any fence with him except he also shall improve in several." (*Id.*, p. 16.) Here is a compulsory fence law, and a provision that only owners of adjoining improved lands can be compelled to contribute to the erection of line fences.

On the 25th of September, 1676, by an ordinance promulgated by Governor Andross, these laws were put in force upon the Delaware river and its precincts, (*ib.*, 455,) and were in force when William Penn received his charter, in 1681.

In the "Body of Laws of the Province of Pennsylvania and Territories thereunto belonging, Past at an Assembly held at Chester, alias Upland, the 7th day of the 10th Month called December 1682," under the Proprietary this matter of fencing was very summarily disposed of in chapter XCI, as follows:

"That all corn-fields shall be fenced, and all fences shall be at least five foot high, and for default thereof such person shall be fined at the discretion of the County Court." (*Ib.*, p. 136.)

When, by the suspension of William Penn's authority and the commission to Benjamin Fletcher, the laws adopted under Penn's government were abrogated, this law relating to fences was considered of sufficient importance to be included in the petition of right presented by order of the General Assembly to Governor Fletcher asking that certain of the fence laws be approved and put in execution, and it was so approved. (*Ib.*, p. 188, &c., p. 551. 1 Smith's Laws, IV–VI.)

In 1700, shortly after William Penn's return to Pennsylvania, the act was passed the repeal of the first section of which is now proposed. It was the natural sequence of the laws to which I have already alluded. It assumes the duty of owners of improved lands to fence them, and purports to be "for preventing all disputes and differences that may arise through the neglect or insufficiency of fences in this Province," &c. It first requires that all corn-fields and grounds kept for inclosures shall be well fenced; second, prescribes what shall constitute a sufficient fence; third, renders the landholder liable for damages to cattle occasioned by driving them out of fields not fenced as required; fourth, provides for the collection of damages by the landholder against the owner of cattle which may occasion injury to fields inclosed as required. This section was subsequently qualified, first, by the act of 17th of October, 1701, repealing the act for the restraining of swine referred to in the act of 1700; second, by the act of 10th of May, 1729, for the erection of pounds, by the sixth section of which so much of the act of 1700 as prescribes what shall constitute a lawful or sufficient fence is supplied by a new and different provision; third, by the act of 4th of March, 1763, concerning horses and sheep trespassing within this Province, which provided a different proceeding for the ascertaining and collection of damages occasioned by horses or sheep breaking into inclosures.

Such was the condition of this legislation at the termination of our provincial history. When, in 1776, the Province of Pennsylvania, with others, asserted its independence of the British crown "all authority being in any person under said King consequently ceased," * * * and "the laws enacted by his representatives here became of no force or effect." It was, therefore, enacted by the General Assembly of the State of Pennsylvania on the 28th of January, 1777: "That each and every one of the laws or acts of General Assembly that were in force, and binding on the inhabitants of the said Province, on the 14th day of May last, shall be in force and binding on the inhabitants of this State from and after the 10th day of February next, as fully and effectually to all intents and purposes as if said laws and each of them had been enacted by this General Assembly." (1 Smith's Laws, p. 429.) Only so much then of the act of 1700, as was in force on the 14th day of May, 1776, unsupplied and unqualified by subsequent legislation, received the sanction of the State Government and became at all operative as a law of the State, and such portion derived its authority, not from its original enactment in 1700, but from its reënactment in 1777.

By the act of 13th April, 1807, the acts of 1729 and 1763 were expressly repealed, so far as they affected the counties of Philadelphia, Bucks, Chester, Northampton, Wayne, and Delaware; and this act of 1807 has since been extended to other counties in the State.

The act of 13th April, 1807, supplied the provisions of the act of 1763, for the collection of damages occasioned by stray cattle, horses, or sheep, but it did not supply that part of the act of 1729 which prescribed what should constitute a lawful and sufficient fence. Ordinarily, the repeal of an act which, like that of 1729, had repealed or supplied the provisions of a former act, would revive the provisions of such former act; but such revival implies previous life and efficacy, and these provisions of the act of 1700, defining what should constitute a lawful fence, not being in force on the 14th of May, 1776, received no sanction under the act of January 28, 1777, and never possessed any vitality under the State government. It was not, therefore, a subject of resuscitation, and the repeal of the act of 1729 left us without any statute prescribing the height and requisites of a lawful fence.

This, perhaps, is not of great importance, because, in 1795, while the act of 1829 was in force, it was ruled by Judge Addison that, independently of the statute, an action of trespass would be to recover damages occasioned by cattle entering an inclosure, although the fence might not conform to the requirements of the acts of Assembly, if the fence were such as would be called neighborly, sufficient to keep out cattle not breeding. (Adams *vs.* McKinney, Add., 258.) And since the act of 1729 was repealed by that of 1807, it was ruled by Judge Elwell that the fence necessary to sustain such an action is such a fence "as farmers of practical knowledge and experience would consider sufficient to protect their crops from injury from usually orderly cattle." (Race *vs.* Snyder, 30 Leg. Int., 381.)

The fact remains that the act of 1700 requires every man to fence his "corn-fields and grounds kept for inclosures," and this, after all, is the important pivotal fact upon which the matter we are considering turns, and upon which the repealing act of 1885 was undoubtedly intended to operate.

As I have already said, it was the law in England that whenever it became the duty of a man to fence his grounds, he could not recover damages which occurred by reason of his neglect to fence, and in the case of Gregg *vs.* Gregg, which originated in Damascus township in this county, the Supreme Court of this State distinctly recognized the common-law rule, which required every man to restrain his own cattle, and held him responsible for their intrusion upon the land of another, and recognized also the qualification of that rule already mentioned, and ruled that *because the act of 1700 imposed upon every man the duty to fence his improved lands*, one could not recover for damages occasioned by stray cattle to lands which were not fenced. (Gregg *vs.* Gregg, 55 Pa. St., 227.) The act of 1682, not having been in force on the 14th of May, 1776, could not be revived by the repeal of the first section of the act of 1700, but we should be remitted to the common law rule, and every owner of improved lands would be entitled to rely for protection upon the ideal fence which the law erects around his possessions. Every owner of cattle would be required to see that they did not trespass upon his neighbor's premises, and would be held responsible for any damages arising from his neglect so to restrain them.

The statutory rule to be repealed, and the common-law rule to be restored, are the exact opposite of each other. The statute says, if you desire protection against your neighbor's cattle—fence them out. The common laws says, if you desire protection against liability for damages, caused by your cattle trespassing upon your neighbor's land—fence them in. Which rule is more desirable in such a community as ours, is for the people to judge. I am not here to advocate either side of the question. If the common law rule shall prevail, (and upon principle this is undoubtedly the rule, unless circumstances render it burdensome or inconvenient,) then you may throw down your fences and cultivate your lands close up to the public highways. No more noxious and unsightly weeds and bushes may be seen along the roadsides through your farms. Subject to the public use for purposes of highways, you have the right to use and enjoy the strips of land. In cases where this has been tried, this result is said to add much to the attractiveness of the country in appearance, besides bringing into use no inconsiderable amount of land, which had not simply lain waste, but had furnished opportunity for a prolific growth of harmful weeds. Whether it will, upon the whole, permit a saving in the general expense of fencing, and operate to the advantage of the community, you farmers must judge.

I have purposely discussed this question upon the assumption that the act of 1885 is constitutional, and in itself complete, so as to effect what I suppose it was intended to—as simply submitting to the people the option of remaining under a compulsory fence law, or restoring the common law rule. I have done so in order distinctly to present the issue which I supposed you desired to have me present.

But I ought not to leave this subject without calling attention to what seems to me a material defect in this act of 1885.

The act of 1807 relating to strays is the only existing act, I think, which makes special provision for ascertaining and securing the damages occasioned by stray cattle. It is the only act which gives, in effect, a lien upon such strays and permits them to be detained until the damages occasioned, by them are paid. This law was passed with reference to the conditions existing at the time. By the repeal of the first section of the act of 1700, it would become substantially a nullity. It provides a remedy in case one finds stray horses, cattle, or sheep upon his "improved and inclosed" land. In the appraisement of damages it requires that the appraisers shall have due regard to the sufficiency of the fence. What, then, shall be the remedy where crops upon an unfenced field are injured by the cattle of an irresponsible owner? What shall be done where injury is occasioned by stray cattle of an unknown owner? I would suggest that, in order to accomplish the full purpose intended by the repeal of the first section of the act of 1700, something further is needed, some legislation akin to that now relating to strays, which shall be adapted to the new conditions, and it is for you to consider whether it would be prudent to throw down your fences until you shall receive the protection of some act of this character.

As to the constitutionality of the act of 23d June, 1885, the occasion does not require of me the expression of an opinion—nor do I think such an expression would be entirely proper. An act of the Legislature of the State, it must be recognized, unless and until its own constitutionality shall be determined by some competent authority. That the Legislature cannot delegate to the people of any district its legislative functions is unquestionable.

Where, by the act of 27th April, 1846, the option was given to the people of certain counties to decide by ballot whether the sale of vinous or spirituous liquors should be permitted in such counties, the Supreme Court, by the agreement of a bare majority of the judges, held that this was such an attempt to delegate the legislative franchise as could not be sustained, and that the act was unconstitutional and void. (Parker *vs.* Commonwealth, 6 B., 507.)

By the act of 3d May, 1871, a similar option was conferred upon the electors of the Twenty-second ward of the city of Philadelphia, and the Supreme Court, by the concurrence of a bare majority of the judges, overruled Parker *vs.* Commonwealth, and held that this was not a delegation of the legislative function, and that the act was constitutional. In the opinion of the majority of the court, this language was used: "When the law came from the halls of legislation, it came a perfect law, mandatory in all its parts, prohibiting in this ward the sale of intoxicating liquors without license; commanding an election to be held every third year to ascertain the expediency of issuing licenses, and the fact of expediency or inexpediency shall have been returned, when commanding that licenses shall issue or not issue. Then what did the vote decide? Clearly, not that the act should be a law or not be, for the law already existed. Indeed, it was not delegated to the people to *decide* anything. They simply declared their views or wishes, and when they did so, it was the *fiat* of the law, not their vote, which commanded licenses to be issued or not to be issued." (Locke's Appeal, 72 Pa. St., 495–6.)

The act of 1885, in its first section, purports to repeal the first section of the act of 1700. In its second section, after providing for an election to be held by the qualified electors of the several counties, it directs that "if, upon a proper count of such ballots in any county, it shall appear that a majority thereof are in favor of repeal, this act shall forthwith take effect therein; but the same shall not take effect in any county of this Commonwealth until it has been ascertained that the provisions thereof are deemed expedient, and desired therein, by an election as hereinbefore provided." Whether such a power comes within the reasoning and ruling of Locke's Appeal, and whether it contravenes that clause in the Constitution which prohibits local or special legislation, are questions for judicial solution.

HOW WORNOUT LANDS MAY BE RESTORED TO FERTILITY BY THE USE OF COMMERCIAL FERTILIZERS ALONE.

By Hon. JOHN W. HICKMAN, *Russellville*, *Chester County*, *Pa.*

[Read at the Doylestown Institute.]

"What we shall eat, what we shall drink, and wherewithal shall we be clothed."

How we should treat the horse. Just what breeds of imported milking stock are the most profitable for the American dairy, are all questions of great import. But the questions of greater import are:

How shall we get this food, and drink, and clothing? How are we to become the possessors of the noble horse, and when shall we be able to gratify our ambitions in selecting from the best herds of Jerseys, Guernseys, or Frieslands, from which only the pure gilt-edged article of butter is to be obtained. Those who have been fortunate in their birth, to whom a goodly heritage has descended, know but little of the great tribulation through which more than ninety per cent. of the farming community of the present day have come up to enjoy their present privileges. They know but little of the tribute that Cæsar demands. The late forced examination of the court records of the State of Pennsylvania is a wonderful revelation of the financial condition of the land-holder—mortgage upon mortgage have been found where none were even dreamed of.

Burdens grievous to be borne are being carried by many, whose cheerful countenances give no evidence of the great undertow that threatens to engulf them. They seem doomed to a life of continuous labor and drudgery. Their annual savings are but the wages of half-paid labor, and the result of the practice of the most rigid economy and self-denial, the business seeming only to give the opportunity for the cultivation of these virtues. The sole gratification is in the fact that we are laying up treasures where moth doth not corrupt.

The great misfortune, however, is that such treasures are not available to prevent foreclosure, and many a worthy man has gone to the wall, not because he was not industrious and frugal, but because he had been unfortunate in choosing his occupation.

As a rule, from a business stand-point, farming, as at present conducted, is but a snare and a delusion, and don't pay. The farmer and his hired man may work side by side bearing equally the burden and heat of the day, from spring till fall, from fall till spring, and when the day of reckoning comes, and all the expenses of conducting the farm have been closely counted—interest, taxes, and incidentals—it will be found, in most instances, that the hired man will be able to show, as a direct result of his labor alone, more clear cash than the seemingly more fortunate man who has been his constant companion in every labor of the farm.

Suppose we should attempt to conduct farming operations without any improvement in method, on a more extended scale, on the principle of a joint-stock corporation, if you please. One thousand acres of Bucks county land of good quality, selected. Stock issued to the amount of one hundred thousand dollars, covering the entire outlay for land and outfit, including live stock.

A corporation is not supposed to do any of the manual labor. A superintendent employed at one thousand dollars per annum. Two hands for each hundred acres; twenty in all, at three hundred dollars each, including board.

The usual amount expended for fertilizers: Say six tons for each hundred acres; sixty tons in all, at thirty dollars per ton. The interest on capital stock, at five per cent., five thousand dollars; taxes, five hundred dollars; necessary repairs, one thousand dollars. Aggregating, without any provision for further contingencies, the neat little sum of fifteen thousand three hundred dollars, all of which must be paid out of the annual product of the farm to insure a five per cent. dividend-paying stock. Does any sane man believe, without any improvement on the present general method, that any such sum could be realized from year to year by such a corporation? If not, then how does the calling rank with other occupations? It can hardly at present be called a business. When, under high heaven, will it rise to the dignity of a profession? Never, until the present incrustation that surrounds us shall have been broken, and we shall begin to farm with our heads as well as with our hands. When we shall have come to accept the teaching of science, and to no longer regard the man as a visionary crank who attempts to show us that success in agriculture is due, in a larger measure, to correct reasoning than is the success in any other pursuit of life.

It is hardly to be expected or claimed that every farmer should be a scientist, or that he shall acquire a thorough knowledge of agricultural chemistry before he can succeed as a farmer. But it is not unreasonable to expect that, in the near future, every farmer will possess such a knowledge of the laws governing plant-life as will enable him to pursue his calling in the future with a much greater degree of assurance as to results than he has ever enjoyed in the past.

But, for the present, we must be satisfied to receive from the hands of others who have been pleased to devote time and money to the solution of agricultural problems that are destined soon to work a revolution that will greatly aid in placing agriculture among the most honorable and profitable of industries.

To M. George Ville, an eminent French chemist and author, in the largest measure, is the honor due for what has already been done to advance the science of agriculture in France, England, and America. At his hands, we are justified in saying that the problem of vegetation has received its absolute solution.

And now the question: Are we ready to accept the teaching of advanced minds, or will we blindly continue in the old ruts? The agricultural columns are not moving with such military precision as requires all to keep step, and a right-about-face movement cannot at once be executed.

But what is most needed at this time is the order to break ranks. Let not him that would move rapidly be longer restrained by the tardy movements of the rank and file. The traditions of the past are not equal to the necessities of even the present, while the future will certainly require much more at our hands.

And now to our subject as announced, how worn-out land may be restored by the use of commercial manures or fertilizers exclusively.

One of the greatest difficulties in dealing with matured people in the way of improving minds or methods is that so much has to be unlearned; and old furniture must be cleaned out to give place to new.

In reasoning with a community of farmers who have pursued a regular stereotyped course all their lives, it has been found necessary to force every conclusion upon them, s every attempt to have them change a method is regarded as an innovation of their rights, and when changes come, they accept them with misgivings, and not unfrequently under the most solemn protest.

But still they come, and the progress made in agriculture in the last fifty years far outmeasures that of any five hundred years of the preceding history of the world.

One of the first and most important facts to be learned is that all farm crops are in a much greater measure, the product of the atmosphere than the soil. Ninety-five per cent., or ninety-five pounds in every hundred of farm products, is from the atmosphere. And when decomposed, unobstructed returns again to the atmosphere.

Such portion is known as the organic elements of plants, and are made up of carbon, hydrogen, oxygen, and nitrogen, in somewhat varying proportions. Carbon is abundant in nature. The solid crust of the globe is largely made up of carbon. The whole catalogue of plants known to science, some two hundred thousand, when in a dry condition contain, with little variation, about fifty per cent. of carbon. We are more familiar with it in the shape of charcoal, coal, wood, &c. The diamond is the purest form of crystallized carbon known; is combustible; burns at a high temperature, and disappears as carbonic acid gas. Animal fats, tallow, lard, butter, &c., consist mainly of carbon. It sustains the animal heat and keeps us warm in winter; whether it comes from the consumption of coal and wood without or the consumption or digestion of animal fats within.

The continual digesting and decomposition of vegetable and animal matter keeps our atmosphere supplied with a sufficient amount of carbonic acid gas for all our natural wants. As the population increases, resources also increase.

We are not, therefore, called upon to supply from foreign sources this element of carbon for the purpose of either restoring or maintaining the fertility of our soil.

Oxygen pure is only known as a gas, is observable only by its properties, and is Nature's great scavenger. It supports combustion without it, coal and wood could not be consumed. Decomposition would not take place. The carcasses of dead animals would remain intact. We ourselves might be buried or corded up when dead, as best suited the convenience of the living. Reproduction could not take place. The cycle would be broken and nature would be dead. The great source is the atmosphere, twenty-one per cent. of which is oxygen. Water is the next great source, every nine pounds containing eight of oxygen. It comprises about one half the living weight of all animals, and enters into growing crops in about the same proportion.

It feeds on the living as well as upon the dead tissues. Combined with hydrogen, it forms the healthy and life sustaining atmosphere.

Uncombined it is destructive to all life. This element of plant-food is so abundant and wisely distributed that notwithstanding its great importance to every crop produced, it is not necessary to apply its compounds to the soil as a component part of a fertilizer.

Hydrogen, the third organic element of plant-food, is derived from the dew and rain-fall. It comprises the one-ninth part of water. Is necessarily abundant, and is abundantly supplied from natural sources.

The three foregoing organic elements of plant food, while entering so largely into all farm products, does not in any measure deplete the soil from which the crops have been taken, and can, under no circumstances prove important factors in their restoration.

Nitrogen—This element is, as has been abundantly proven, one of the most powerful factors in plant production, and cannot, under any circumstances, be dispensed with. Seventy-nine per cent. of the atmosphere is nitrogen. Abundant as it is, it is the most costly of all the essential elements of a complete fertilizer. It enters into the composition of plants in a much smaller measure than any of the other organic elements.

The circumstances under which it combines with other elements of plant food are peculiar to itself, and but few plants, profitable to the agriculture of this locality, possess the property of absorbing it from the atmosphere in such quantities as to fully meet the wants of the crop and give the best paying results. In combination with hydrogen, it forms ammonia; with soda, forms nitrate of soda; with potash, forms nitrate of potash; ammonia combines with sulphuric acid and forms sulphuret of ammonia. These salts are largely used in the compounding of complete fertilizers in England, France, and America.

The lean fibrous meat of animals, fish, etc., give off nitrogen during decomposition. The nitrogen thus produced within reach by the growing plant has been found to be the most effective. The reason science has not yet explained, one hundred bushels of wheat contain about one hundred and fifty-six pounds of nitrogen, one half of which it has the property of absorbing from the atmosphere, the balance must be obtained through the soil, and where the soil does not contain it, or it is not supplied artificially by the application of farm manure, or nitrate compounds, a profitable wheat crop is impossible. A rye crop has the capacity of absorbing from the atmosphere eighty per cent. of the nitrogen necessary for its full and complete support; while the corn crop possesses in a still greater degree the same property, thus rendering it less necessary to use highly ammoniated manures in their production.

A knowledge of the various wants and capacities of the different crops thus becomes a necessity. Without such knowledge the whole system is but little better than a blundering one.

The inorganic elements of plants are such as are indestructible, and cannot be destroyed by burning, that have not the organs of growth. When plants are burned the inorganic elements of such burned plants remain intact in the ash so produced. They are as follows: Phosphoric acid, potash, lime, soda, magnesia, silicon, chlorine, iron, manganese, and sulphur. They constitute about five per cent. of all plants; although forming so small a proportion in plant production, they are all indispensable, and profitable crops cannot be grown when the supply is not sufficient to meet the demand in full.

About twenty-five years ago, George Ville, the eminent French chemist before referred to, under the patronage of the French government, commenced a series of experiments on the experimental fields at Vincennes, in France, which were subsequently extended to various parts of the country, and to England, for the purpose of determining in the most practical way, not only just what were the most essential elements in plant production, but just in what measure the soil would naturally supply them, as well as to determine the exact difference between soils that have been reduced to an impoverished condition by successive cropping, and those that were in a high state of productiveness.

The theory of chemical or laboratory analysis of soils, for the purpose of determining in just what elements of plant-food the soil was deficient, had already proven to be uncertain and unsatisfactory.

Mr. Ville's theory was of a more practical character. The analysis of soils by the plants themselves has proven to be infallible in every instance. And twenty-five years of practical experience in all parts of the civilized world has but strengthened and permanently established the correctness of the results and facts so obtained.

Mr. Ville commenced with the chemical analysis of the wheat plant. The elements of the plant were prepared in the shape of chemical powders—in the same proportions in which they were found in the plant. Soil was artificially prepared—first, by procuring pure sand, washing and calcining by subjecting to a heat of 212°. The washing removing all extraneous matter, and the calcining disposing of all nitrogenous compounds and moisture. Glazed earthen pots were employed to the number of the various elements of the plant. Seeds were planted. One of the elements was withheld from each pot, except one, in which all the elements were used. The relative value of each element was thus determined, as well as their combined value. The whole was watered from time to time during the growth of the plants with distilled water. The result produced was more or less imperfect in every instance, except where the entire compound was used, and in this a perfect crop was produced in the otherwise barren sand by the use of chemicals alone, the sand only serving as the medium through which the plants were fed, and to hold them in proper position to receive it. This led to still further experiments, with the same results.

Experiments were afterwards conducted upon natural soils on the experimental fields, and throughout the country, for the purpose of determining their true condition. And it was found that the application of seven of the inorganic and three of the organic elements could be dispensed with without any detriment whatever to the crop. This positively established the fact beyond peradventure that all soils are naturally abundantly supplied with all but four of the fourteen essential elements always necessary in plant productions.

So much having been accomplished, further experiments were conducted on natural soils for the purpose of determining the relative value of the four remaining elements, one or more of which is always absent from exhausted or depleted soils. It is, therefore, obvious that the only difference between impoverished land and land in a state of profitable productiveness is the absence or presence of nitrogen-phosphoric acid, potash, and lime in sufficient quantity to meet the wants of the crop.

The relative value of these four essentials was determined in like manner, the absence of any one of them seriously affecting the yield.

On an experimental field at Vincennes, in 1863, the natural soil produced twelve bushels of wheat per acre and two thousand three hundred and thirty-three pounds of straw. The plot to which was applied phosphoric acid, potash, and lime, yielded eighteen bushels of wheat and two thousand six hundred and forty-three pounds of straw per acre. The plot to which nitrogen alone was applied gave twenty-two bushels of grain and three thousand and sixty-nine pounds of straw per acre, thus establishing the fact that nitrogenous matter alone was of greater value to the crop than the three mineral substances combined. The fourth plot received the complete manure, nitrogen, phosphoric acid, potash, and lime, and the result was fifty and one half bushels of grain and six thousand one hundred and eight pounds of straw per acre. From these experiments, in the last quarter of a century, has gone out all that is practical in the way of profitably restoring the waste and desert places.

So well established has become this theory that many of the leading agricultural States in the Union have enacted laws requiring manufacturers of commercial manures to give practical guarantees that their product contains three of these compounds, viz: nitrogen, phosphoric acid, and potash, while the universal practice is coming to be the application of chemical manures to all crops, regardless of the manurial product of the farm. We are fast learning the manurial value of farm crop, and that the impoverishment of the farm is not due most to the fact that hay, straw, and fodder is sold off the farm, than to the fact that sufficient chemical manures have not been purchased to supply the waste. The farm to the farmer is what the factory is to the manufacturer: the medium through which crude, raw material is converted into merchandise, essential to the comfort and well-being of society, with this difference, that the manufacturer is bound to purchase his raw material in the busy marts of the world, while the farmer purchases his less than three per cent., and draws from Nature's great storehouse the other ninety-seven per cent. With this advantage seemingly in our favor, does it not seem strange that the farmer is not the most prosperous and happy man to be found anywhere.

To maintain the fertility of our farms, or to restore their fertility, it is not a question of hay, straw, or cornfodder, or even farm manure.

When they can be sold for double their manurial value, based on the available nitrogen, phosphoric acid, and potash they contain. exclusive of the cost of marketing, when not needed as feed or litter, it is certainly more profitable to sell and invest proceeds in complete chemical manures.

The manurial value of 2,000 pounds of clover-hay, based upon 18 cents per pound for nitrogen, 12 cents per pound for phosphoric acid, and 5 cents per pound for potash is, ... $6 02 per ton.

2,000 pounds of wheat straw, ...	1 84	per ton.
2,000 pounds of oats straw, ...	1 70	per ton.
100 bushels of corn, ...	17 66	per ton.
100 bushels of oats, ...	9 31	per ton.
2,000 pounds of cornfodder, ...	4 21	per ton.
2,000 pounds of meadow hay, ...	5 89	per ton.
100 bushels of potatoes, ...	8 26	per ton.
2,000 pounds of wheat bran, ...	12 05	per ton.
2,000 pounds of stable manure, ...	1 74	per ton.

It will no doubt be said that the mechanical condition of the soil has much to do with its productiveness, that this carbonaceous material, contained in hay, straw, and cornfodder, materially contributes towards keeping the soil mellow and light; the value of which has not been estimated. In the double value previously mentioned at which it is considered profitable to sell such farm product, regard was had to that matter. On well cultivated farms the stubble, second crop and roots, as well as the farm manures that become incidentally necessary, will be found ample for such purpose.

The true method is to first determine in just what element our land is defective. To supply the deficiency from the nearest and cheapest market, and to supply in sufficient quantity to run the farm to its full capacity.

Discussion.

Mr. BROWER of Bucks county. What is the first step that should be taken to find out what it is necessary to apply to a soil in order to increase the fertility?

Mr. HICKMAN. If the farmer is not well informed as to the facts of agricultural chemistry, (and but few are,) he should accept the truths as ascertained by scientific men. They have determined that phosphoric acid, potash, and nitrogen are the three elements which are best adapted to all soils and all situations.

Mr. BROWER. What crop shall I grow?

Mr. HICKMAN. The nature of your crop must be determined by your market. You should produce that crop for which you have the best market.

Mr. LLOYD. I think that the first thing to be done is to plow down a crop of clover.

Mr. HICKMAN. Nine years ago I purchased my farm. It was very much run down; so much so that parts of it would not produce enough grass to keep my sheep. I applied six hundred pounds of complete manure (a fertilizer having all three elements) to the acre, and planted it with corn. I raised fifty-two bushels per acre with the six hundred pounds. I put it in with wheat for several years in succession, and each time I used four hundred pounds of phosphate to the acre. I sold the wheat for one dollar and fifteen cents per bushel, and the corn for eighty-five cents. By the five crops I made the land worth one hundred dollars per acre, and had the crops beside. I paid for the land and the fertilizer and had thirty-one dollars per acre left for profit. The next year I mowed it, and took sixteen loads of hay off it (one field being referred to); I then put it in with corn again, and applied fertilizer as before, but no yard manure, and took off at the rate of fifty bushels of corn per acre. The field had but one year's rest from the plow in nine years, and it is worth fully fifty dollars more per acre than when I bought it.

Mr. LLOYD. Have you faith that if you go on in this way for forty or more years that the field will respond with the same or increased crops?

Mr. HICKMAN. My faith has in no way been shaken by the experiment and its result. I have had conversations with farmers throughout my country who have adopted this plan.

Mr. BROWER. I have the fullest sympathy with the gentleman who has just read the essay. If he went on and made money, raising crop after crop, without any selection or rotation, discarding everything like what we style rotation, he has accomplished what we have failed to do. It is necessary to provide for a rotation in farming for profit. You know that we are after the dollar every time here in Bucks county. If you can make it appear to us all that clover is not needed in a rotation of crops, then I need not think of plowing down a ton and a half (or its equivalent in grass,) of clover hay to raise a profitable crop.

Secretary EDGE. Can a Bucks farmer afford to plow down a ton and a half of clover hay to produce a crop? Is not the hay too valuable for that? Is it not too expensive manuring to be profitable?

Mr. Hickman. I think that I can make more money by raising wheat after wheat. If you want to feed cattle, you will of course need clover hay. I raise grain, and hence do not, in my system, need the clover. Clover roots furnish as much plant-food to the soil as the tops; that is, they furnish as much actual phosphoric acid and potash. In England, Lawes and Gilbert have experimented on the same field for twenty-five years without yard manure, and have annually increased the production of the field; the land produced better with each crop. If you have the machinery and raw material, you can readily make the goods.

Watson Kenderdine. What is the analysis of your complete manure?

Mr. Hickman. Such elements as make it necessary to produce a perfect crop. To determine what will constitute a complete manure, one must know what elements, and in what proportion, are removed by the crop.

[**Note by the Secretary.**—Mr. Hickman illustrated his essay and address by a number of tabular maps, giving the constituents removed by each crop, with the weight of each. These maps also illustrated the name and amounts of these constituents as they would be replaced by a given amount of a complete fertilizer. It is to be regretted that we cannot reproduce these tables here, as they are essential to a proper understanding of the essay and address. In using the term "complete fertilizer," it is to be understood that Mr. Hickman refers to one which contains phosphoric acid, potash and nitrogen, and that he uses the term as a distinction from acidulated South Carolina rock, or other fertilizer furnishing but one element.]

Secretary Edge. You have given in your tables the value of one ton of clover hay fed on the farm and converted into manure, as $8 09. Does not this value vary very much with the kind of stock to which it is fed? Is it not worth very much more fed to fattening cattle than to milk cows whose product is taken off the farm; and very much more valuable when fed to fattening cattle than to growing stock? Is it not, therefore, misleading to attempt to give by one set of figures, the value of a ton of clover hay when converted into manure?

Mr. Hickman. Certainly; you are right; if fed to fattening cattle, you return much more of the hay to the manure pile than when fed to milk cows.

Mr. Blackfan. In your estimated value when plowed under, when are we to understand that it is turned under—when in full bloom, or when ripe and dry?

Mr. Hickman. When it has reached its greatest growth, but when it is still green, say, when ready to cut for hay.

Mr. Kenderdine. Would you use the same grade of complete fertilizer for corn as for oats and wheat?

Mr. Hickman. The time has not yet come when farmers are prepared to tell exactly what they need for any given crop. The safest thing to do, in the absence of actual knowledge, is to use enough potash to cover all contingencies, and nitrogen enough for all crops. I say that a fertilizer so prepared will be good for all or any crop, but it is quite possible that you may have more than enough of one or more elements, but we have not yet reached a condition of knowledge to know this beforehand.

Mr. Oliver. If you took calcined sand as a soil basis, would you use the same fertilizer for corn, wheat, and oats?

Mr. Hickman. I would take exactly the same ingredients for all, but would not mix them in the same proportions for all crops. Some require more potash than others, and some more phosphoric acid; but, as I stated before, we are not yet able to determine the wants of each crop. Of course we have various fertilizers advertised for different crops, but we are not yet educated up to this point.

Mr. Oliver. In the system of farming of which you have just given an account upon your own farm, did you give the fertilizers the credit of all of the improvement? Did the man who preceded you plow as deeply as you did? Did you not, by plowing deeper, obtain some benefit in that way? If your predecessor plowed but four or five inches deep, and you plowed six or seven, a portion of the improvement was due to this cause.

Mr. Hickman. I would answer by saying that I did not plow as deeply as he did.

M. W. Oliver. That, then, makes the point clear, and you are justified in crediting all of the improvement to the fertilizer used.

Mr. Hickman. Many of us use too little fertilizer on our crops, and by using too little, fail to obtain the benefit of what we do use. In 1876, James S. Harris, of Still Pond, Kent county, Maryland, told me that he was going to put in his field of wheat without any fertilizer. He came to me one day and said, "I will put in my wheat without any fertilizer of any kind," and I said to him, "I will furnish the fertilizer for your field of wheat, if you will put in one acre without, and the rest with the fertilizer as I furnish it, and I will take my pay out of the increased crop." He had been using only from one hundred to two hundred pounds per acre. I furnished him with four hundred pounds per acre. He was a close calculator; he said he would always be willing to make such a bargain. I said, "You will never give me the chance again." On one acre we put nothing, and then two hundred pounds, and on the remainder at the rate of four hundred pounds per acre. The price of the fertilizer at that time was $42 per ton. Where we put on but two hundred pounds, there was a loss of seven dollars per ton, but where we put on four hundred pounds per acre, we obtained $99 97 per ton for our fertilizer. The clover grew heavy up to the edge of the acre to which nothing had been applied, but there was no clover on it. I said, "Mr. Harris, would you take the price of the fertilizer for that stand of clover?" He said, "No." "Then," said I, "I have made 99 per cent. upon my investment, and you have made 100 per cent. upon yours." Eight years afterwards he told me that he could see the effect of the application in the corn crop. He buys his fertilizer by the boat-load now, and ge s both profits, and I have lost the job.

A farmer at Bergen Point, on the Chesapeake bay, complained that he could raise no crops. I told him that he did not apply enough fertilizer, and recommended the use of six hundred pounds per acre. His reply was, "He had better purchase another farm than do that." I then offered to furnish the fertilizer for thirty-two acres of corn, at the rate of six hundred pounds per acre, and take the increase in the crop for my pay. He was to put two hundred pounds on one acre, and the crop from this was to be the standard of measurement—I to have all on the other thirty-one over and above the product of this standard acre. The growing corn was the marvel of the neighborhood. When the corn was ripe, he put the field in with wheat, and husked the corn after the wheat was planted. In March, after the corn was shelled and marketed, we had our settlement. After allowing for the actual price of the fertilizer used, with six per cent. for interest, I had just $141 left as my overplus. I gave him $70 of it, and then, upon the principle of throwing away a mackerel to catch a whale, I gave him the other $70. That field, without manure, raised year before last thirty-five bushels of wheat per acre. The product was so fine that it readily took the premium at the county fair. To-day he has a good bank account, and recently said that if I had given him a thousand dollars I would not have helped him as much. That field is known as the Hickman field to this day.

A GENTLEMEN. What was the character of the soil—was it a loose, sandy soil?

Mr. HICKMAN. It was what I would style a heavy loam soil. If you have a heavy clay soil, you know that you cannot successfully raise clover upon it, until you have altered its texture and condition.

Mr. LLOYD. Will not the proper use of barn-yard manure, lime, and clover, at home, do more than an investment in commercial fertilizers, and bring better results in the end?

Mr. HICKMAN. I do not think so, and such is not the result of my experience. I have given you the facts; it is for you to draw the deductions for yourselves.

Mr. LLOYD. Will South Carolina rock do best by itself or in connection with yard manure?

Mr. HICKMAN. In two thousand pounds of ordinary and average barn-yard manure we have eight pounds of nitrogen, three pounds of phosphoric acid, and ten pounds of potash. If we obtain better results by the use of acidulated South Carolina rock with our stable manure, it is proof that the latter does not contain enough of phosphoric acid, for the South Carolina Rock furnishes nothing else. The reason is that you more nearly approach the composition of a complete fertilizer. If you can make this complete manure commercially, you will obtain the same results. The rock contains nothing but phosphoric acid; why not use less of this, and devote the extra expense to the purchase of a small amount of potash and nitrogen? Your fertilizer will cost no more, and will give you much better results. In applying large amounts you do not want your fertilizer in too soluble a condition. Bone lasts longer than rock simply because they are not so readily available to the crop, on the same principle as the man liked the bank because he could only draw so much of his capital out every day.

A GENTLEMAN. Will constant plowing impoverish the soil?

Mr. HICKMAN. Plowing does not impoverish the land. No farm is made poorer by plowing. Land may become better each time that it is plowed.

Mr. BROWER. How about fertilizer for fruit trees?

Mr. HICKMAN. I have two farms where the complete manure has been applied to fruit trees. Four hundred pounds per acre, at a cost of about seven cents per tree, gave a profit of over one thousand per cent. This can be authenticated, if necessary.

Mr. SHOLLENBERGER President. We shall have to close this discussion and proceed to the next order of business. Thomas J. Edge, Secretary of the State Board of Agriculture, is present, and will endeavor to answer any questions relating to commercial fertilizers.

Secretary EDGE. Mr. President, I have taken a deep interest in the discussion, and in the points brought out by practical farmers present. I find that I always learn more from one with whom I cannot entirely agree, than from one whose views I can fully indorse. I think that this is the case with us all, and therefore I hope that this discussion may go on, for I feel that we are getting more solid information than we would be likely to obtain in any other way, especially as our time is somewhat limited.

Mr. LLOYD. How much of our fertilizer do we lose by putting it on in large amounts beforehand?

Mr. HICKMAN. In a heavy clay soil, but very little; in an open and sandy one, more.

Mr. TOMLINSON. (Referring to the diagrams.) Do we understand that in the experiment there illustrated that with pure sand and a complete fertilizer they obtained twelve bushels of wheat per acre?

Mr. HICKMAN. Not with pure sand, but with such soil as they found in France.

Mr. TOMLINSON. I think that taking the soil of an ordinary sand barren, we would not get our seed by the treatment indicated in the experiment. This shows that where experiments are tried in a limited way, the results may differ very materially from those of practical work.

Secretary EDGE. It must be noticed that the pots of pure sand had this advantage over the sand of the barren land, alluded to by Mr. Tomlinson—it had all the water it needed applied at the right time, and in regular amounts, which the natural soil has not, and which make or lose the natural soil crop. The experimental pot has all things in its favor, as have all of the others. In the natural condition of things as we have them on our farms, it is different, and hence, we obtain different results, as Mr. Tomlinson has stated.

Mr. TOMLINSON. In the chemical experiments which have been explained, I note that one very important element has been omitted. I mean carbon; which, if not virtually necessary, is at least of very high value as a mechanical loosener of the soil. In our climate, and especially in our soils, if we have no carbon, (vegetable matter,) we have no crop. No matter how highly fertilized, the crop will and must suffer. All of these things must be taken into consideration. I differ with the gentleman in his opinion that the way for farmers to prosper is to get out of the old ruts. I believe that, as a rule, farmers see their way clearly.

Mr. BROWER. Making allowance for all of these experiments by distinguished scientific men in England, France, and Germany, we must, in order to raise profitable crops in Bucks county, raise clover and sow clover seed. If you cannot get clover to grow, you need potash, and when you can grow two or three tons of clover hay to the acre, you can get anything. We are just beginning to discover for ourselves that we need phosphoric acid, potash, and nitrogen; the great thing now for us to learn is in what condition we shall get them, and how, when, and where to apply them.

The gentleman says that by plowing we shall not lose anything. I hold that by mellowing the soil with nothing growing to hold its soluble ingredients, they are carried off by every rain; but sow clover, and it will retain them, and by turning the clover under, we can retain them for our crops, and thus save them. It is stated that the Southern pea is a better crop to concentrate and retain ammonia than clover. Can any one tell us anything about its success as a crop?

M. W. OLIVER. To a very limited extent we have sown them this season, but with us (probably owing to the season) the crop is too short to furnish a criterion by which we may judge of our future success with the crop.

At first sight it would seem that, in relation to fertilizers, that if in the crop we have removed forty-five pounds of nitrogen, and we apply that amount in a commercial fertilizer, we have returned all that we took off, and the land should not get any poorer.

Mr. BROWER. But we waste this nitrogen by allowing it to leach away through the loose soil.

Mr. OLIVER. But we do not waste as much in this way as we do in plowing down a crop of clover which would make two tons of hay per acre. If, as has been stated, a ton of clover is worth $7 as food, and that the resulting manure is worth $8 90 more, we then have a total value of $15 90 per ton. Are we then not wasting value by plowing clover down? Two tons' yield per acre (when fed on the farm) are thus made worth $30, which would buy a large amount of commercial fertilizer.

Or, on the other hand, the second crop of clover should have produced at least three bushels of clover seed per acre, worth, say $5 per bushel, or $15 in all. We find that plowing down clover may then be expensive, comparatively speaking. And, further, there is nothing which our farmers use as indiscriminately as they do fertilizers. They put them in at the same depth for all crops. We think that for potatoes it should be applied deeper than for wheat or oats, and for corn deeper than for wheat.

We also are working too much in the dark as to what our soils need. In many cases we are using more of certain elements, and less of others than our soil and crops need, and are thus wasting our money. But, Mr. President, I am a great believer in barn-yard manure, and think that it is the best fertilizer that we can possibly get, and the more we get of it, the better our farms and our bank account will be. If we cannot get enough of it, (and few of us ever can,) we must supplement it by commercial fertilizers as the next best, and we must use them as a means of obtaining the yard manure.

[NOTE BY THE SECRETARY.—The discussion as here given, and much that was not preserved because it was illustrated by diagrams, indicates that there was a difference of opinion between Mr. Hickman and the practical farmers present. It is also evident that this difference of opinion was mainly as to the value of vegetable matter in the soil. Mr. Hickman took the position that the continued application of phosphoric acid, potash, and nitrogen, in amount larger than was removed by the crops, would eventually improve the soil, and increase the annual crop. On the other hand, Mr. Tomlinson assumed that vegetable matter (carbon) was necessary to the crop, and that it must be added to the soil in the shape of yard manure, or other available form. Mr. Lloyd claimed that the plowing down of clover was the best and most economical means of providing this vegetable matter. The essay and address of Mr. Hickman was illustrated by a series of large colored drawings, showing the results (by photography) of a French experiment, in which crops, to a very limited extent, were grown in pure sand, and in similar sand fertilized with each one of the elements named above, and with them arranged in pairs in every conceivable variety. One pot was fertilized with all three mixed in certain proportions, and it exhibited by far the best results. In reducing this experiment to practice, we at once meet with several difficulties. In the experiment, each pot had all the water needed artificially supplied, while in the practical or field experiment, this would not be the case; hence, the assumption of Mr. Tomlinson, that in practice the barren soil would not produce at the rate of twelve bushels per acre, as it did in the watered pot, and that the result with any or all of the other fertilizers would have been seriously affected and disarranged. It was claimed that no better form of plant-food could be obtained than the straw of the grain, and that in this form, the food was exactly in the proper proportions to produce more straw. On the other hand, Mr. Hickman claimed that the plant could more readily obtain its food in the shape of a fertilizer than as straw, in which shape the material had taken on an even more insoluble form, and was not nearly so readily assimilated by the plant as at first. In opposition to this we have the theory of Prof. Mapes, that each time a pound of nitrogen passed through the crop or animal, its actual value as plant-food was increased, and that the argument which held good for nitrogen was equally good for all other elements of plant growth.

Another strong argument advanced by Mr. Hickman was that plants could obtain the carbon necessary for their growth from the atmosphere much more readily than from the soil, and that the atmosphere contained an unlimited amount of carbon in an available form. In the discussion this point was not met with any degree of strength, and hence no decision was reached.

As is usual in all cases of differences of opinion, it is quite probable that the correct course is a medium between the two; and that we can best maintain the fertility of our farms by the careful husbanding and care of the yard manure, applying all that can be obtained, and increasing its amount by the use of commercial fertilizers of approved brands. The result of the opinions expressed was to the point that the continued application of a fertilizer containing but one (any one) of the three elements named, would sooner or later result in loss in crop.

ROTATION OF CROPS NECESSARY TO GOOD FARMING.

By H. M. CUTSHALL, *Guy's Mills, Pa.*

Plants, like the animals of the farm, differ much in their habits, and in the different kinds of food on which they subsist. The ability to grow good crops depends largely upon the intelligence of the farmer, and requires from those engaged in farming constant care and a system of thoroughness equal to any other branch of business in which people are engaged.

The idea that it requires of those engaged in agriculture little or no education, is fast being exploded, and when thoroughly eradicated from the minds of parents, the business of farming will take its place with other branches of industry in the front, as it was in the beginning of time. The different elements contained in the soil, which go to make food for plants, demonstrate the wisdom of the Creator, and is a reminder to the cultivator of the soil that these laws must not only be understood, but judicially carried out, or the most fertile soil will become a barren waste.

Where a continuous crop of any kind is grown year after year, the materials which are contained in the soil, and which enter into the crop, are being continually drawn out until the soil is barren as far as resources to such crop is concerned; and yet, the fertility of the land may be such that other crops, which require different plant-food, may be grown with success. We are taught that the broad-leafed clovers, turnips, and mangolds abstract from the air a large proportion of the materials of their growth; while the narrow-leafed grains and grasses, especially if their seeds are ripened, partake more largely of mineral food drawn from the soil.

The cereals require for their healthy nutrition large supplies of phosphoric acid and silica; leguminous plants devour a large share of lime; turnips, carrots, and clover take up a great amount of potash, &c.

Corn crops when occupying the ground favor the growth of weeds; well-tended root crops, on the other hand, afford better opportunity for deep culture, for the extermination of weeds, for the convenient application of manures; whilst being in great part consumed on the land, they raise its fertility.

From these considerations and conclusions, the farmer of arable land is led to grow a succession of dissimilar plants, or, in other words, to adopt a "rotation of crops." The cereals which exhaust the farm, on account of their ripened seeds being sold off, are generally alternated with fallow-root, or other cleansing crops, or with beans or peas, which occupy a kind of intermediate position between the cereals and the roots, while clovers and grasses or taken at intervals of four to six years.

The rotation most suitable for a particular farm varies according to soil, climate, markets, available supplies of manures, amount of live stock kept, etc. That course of cropping is evidently the most desirable which will economically secure, with thorough cleanness of the soil, a high and increasing state of fertility.

As our land increases in value, an increased interest must be had in order to make farming anything like a paying investment. Work must be systematized. Owners of land must know the qualities of their soils and what they can produce.

In the older countries of the Old World the business of farming is systematized, and the farmer knows just what his land contains of plant-food and consequently just what he can raise. In Scotland, the Norfolk or four-course system is used. It consists of: 1. Clover or mixed grass seeds. 2. Wheat or oats. 3. Turnips, swedes, mangolds, potatoes, or bare fallow. 4. Barley. The details of this system are as follows: The clovers or grasses are mowed or grazed; when cut they are either used green or dried for hay. In districts where manure can be had, a liberal top dressing is given the land immediately after the grass is cut. On poor and worse cultivated soils, the grass crop usually remains down for two or even three years, thus extending a four into a five or six years' rotation.

The clovers or mixed grasses are plowed up in autumn, and followed generally in England by wheat, and in Scotland by oats. The Norfolk four course system is unsuitable for heavy lands, where a large breadth of roots cannot be profitably grown, and where their place as a cleansing crop is taken by bare fallow, vetches, or pulse.

Bare fallows are, however, less frequent than formerly, being now confined to the most refractory of clays, or to lands so hopelessly full of weeds as to require for their extirpation several weeks of summer weather.

The constant aim of this system of farming seems to be to cleanse the ground from weeds, and I look upon this feature as of the utmost importance to the farmers in this country.

How many farmers plow and fit the land for a crop, procure artificial manures at a great expense, in addition to what is made upon the farm, and then see the weeds absorb these manures, choking and destroying the crop, and polluting the earth with a quantity of seeds which requires great labor in after-years to exterminate.

In all well cultivated districts stock-farming is extending, and this has a tendency to raise the fertility of the soil. This will in time induce farmers to increase the acreage of roots; their culture tends to cleanse the soil of all obnoxious and unprofitable weeds, and is a valuable addition to the food for winter feeding. In sections where stock-raising is connected with farming, too little attention is given to grazing or pasturing the land. I deem this one of the most essential features of rotation. Meadow lands which have lost their sod and present a ragged appearance, if turned to pasture will at once take on newness of life. God intended the hoof of the animal to come in contact with the soil, and fields long under cultivation, with nothing to firm the soil. made light by constant tillage, is an admirable abode for insects which prey upon plants.

This pasturing makes the soil more firm, and consequently less liable to be infested with these pests. Good rotations do not necessarily insure good farming; they are merely means to an end. Good crops take largely from the soil. This drainage must be returned by sufficient application of manures to insure equally as good ones in the future, or little will be gained.

The thoughtlessness of the early settlers on our Western prairies where a continuous system of cropping and returning nothing back, thinking that they had an inexhaustible mine from which they could draw for all time, have awakened to the fact that they have ruined their lands. To-day, the farms once returning wheat to the amount of thirty to forty bushels per acre are yielding twelve to fifteen, and even less. Could those immense stacks of straw which were considered a burden, and were made food for flames, have been converted into manure, and returned to the land; could those fields have had the benefit of rest; had some rotation been practiced, even occasionally seeded down and mown, or pastured, how different would be their condition to-day. These men have seen the folly of their ways they see fields once capable of producing large crops infested with weeds, and unable to return to their owner crops which will remunerate him for labor and money expended.

What is true of the great West is equally true of our section here. Here the process has been slower, the farmer has been confronted with forests, which, in clearing and fitting for cultivation, has enabled us to have yet some land which we can hedge on while recovering from errors made in the past. In the West, with no forests to check them in their work, with all the improved machinery for plowing, seeding, and threshing, agriculture has swept that garden of the world, as the prairie fires have been wont to do before the settlement by man. The contrast can be explained as the son of the "Emerald Isle" explained the difference between "Barbarism and Civilization." The one, he said was beating your enemy's brains out with a club, while the other was shooting his head off at a four-mile range with a large cannon.

We are here to look at the past—all the mistakes which we and others have made, and try and avoid them in the future.

The times admonish us to economize; raise more on less ground than formerly; carefully study our business. Take for example those farmers who make their business a success; they read agricultural papers; join societies, which have for their aims and purposes the elevation of the farmer; attend such meetings as these, created and carried on in the interests of agriculture; and in general, work for the elevation of our class.

TABULAR WEATHER REPORT FOR THE YEAR ENDING DECEMBER 31, 1886.

By J. L. HEACOCK, Esq., *Quakertown, Pa., Meteorologist of the Board.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Averages and amount of rain fall, etc., for the year.
Highest temperature,	58	55	68	77	77	77	86	86	86	76	68	49	71.08
Lowest temperature,	4	4	8	29	40	46	50	47	41	24	21	6	25.83
Average temperature,	23.97	23.46	35.61	50.30	55.97	62.83	68.48	67.16	63.83	53.29	41	25.98	47.61
Greatest temperature, mean,	30.70	35.18	42.97	60.23	64.87	71.60	77.18	27.84	72.73	62.93	49.63	33 89	58.10
Lowest temperature, mean,	17.09	18.50	25.23	40.73	47.39	54.83	59.23	58.61	53.96	43.68	32.53	17 81	39.09
Daily range of temperature, greatest,	29	30	24	33	32	25	26	26	30	33	24	31	28.75
Daily range of temperature, least,	4	5	7	3	4	8	10	6	4	4	6	6	5.58
Daily range of temperature, average,	18	15.57	16	19.50	17	17.27	18	17.28	18.43	19.26	17.01	16	17.08
Monthly range of temperature,	57	59	55	48	37	31	36	35	45	52	47	43	45.41
Barometer, highest,	30.08	29.77	29.72	29 83	29.64	29.60	29.55	29.64	29.75	29.82	29.74	29.81	29.75
Barometer, lowest,	28.20	28.78	28.61	28.71	28.96	28.88	29.10	29.01	29.04	29.17	28.88	28.82	28.85
Barometer, average,	29.31	29.86	29.23	29 42	29 29	29.81	29.29	29.32	29.43	29.49	29.81	29.41	29.35
Barometer, daily fluctuations averaged,	.13	.13	.10	.07	.06	.08	.04	.05	.07	.08	.12	.09	.07
Amount of rain fall and melted snow,	3.68	5.74	4.46	2.64	6.66	5.06	4.84	.68	1.17	2.65	4.89	2.43	44.93
Number of days upon which rain and snow fell,	13	7	7	4	10	7	8	1	7	5	7	9	85
Number of days fair,	4	4	2	5	.....	1	2	2	8	5	3	5	41
Number of days clear,	11	12	15	16	14	16	18	21	12	17	18	10	180
Number of days cloudy,	8	5	7	5	7	6	3	7	3	4	2	7	59

REMARKS.—Elevation of surface of mercury in cistern of barometer above sea level, about 536 feet. Correction for instrumental error of barometer used, 110, and every observation reduced to 32 degrees. Kind of rain-gauge signal service, and the height thereof above ground, 6 feet 1 inch. Self-registering thermometer used. Daily mean temperature is for the 24 hours. No unusual weather to note for past year, except during the months of August, September, and October there was quite a drought—water scarce. Farmers had a difficult time to get their fall seeding done on account of the ground being hard.

LIST OF COUNTY AND LOCAL AGRICULTURAL SOCIETIES,

With names and addresses of secretaries and dates for holding fall exhibitions of 1886. Both days named included. Compiled from official reports and sources by the Pennsylvania Board of Agriculture.

Those marked with a * are represented in the Board of Agriculture by elected members.

COUNTY.	Corporate Name or Title of Society.	Name and Address of Secretary.	Where held.	When held.
	Pennsylvania State Agricultural Society,	D. W. Seiler, Harrisburg,	Philadelphia,	September 6-18.
	Tri-State Exhibition,	R. H. Thomas, Mechanicsburg,	Williams' Grove,	Aug. 30—Sept. 4.
Adams,*	Adams County Agricultural Society,	J. S. Witherow, Fairfield,	Gettysburg,	September 21-23.
	Western Pennsylvania Poultry Society,	C. B. Ethen, Pittsburgh,	Pittsburgh,	No fair.
Armstrong,*	Armstrong County Agricultural and Horticultural Association,	W. L. Peart, Kittanning,	Kittanning,	October 5-8.
Do.	Leechburg Agricultural Society,	E. Burchfield, Leechburg,	Leechburg,	No fair.
Do.	Dayton Agricultural and Mechanical Association,	W. R. Millisen, Dayton,	Dayton,	Sept. 28—Oct. 1.
Do.	Petroleum Agricultural Society,	Robert Belph, Parker's Landing,	Parker's Landing,	September 21-24.
Beaver,*	Beaver County Agricultural Society,	J. G. Mitchell, Beaver,	Beaver,	No report.
Do.	Mill Creek Valley Agricultural Association,	W. S. Stevenson, Hookstown,	Hookstown,	August 24-26.
Do.	South Beaver Farmers' Club,	J. S. Elder, Darlington,	Holds no fair,	No fair.
Bedford,*	Bedford County Agricultural Society,	J. Amos, Bedford,	Bedford,	No report.
Berks,*	Berks County Agricultural Society,	C. T. Fox, Reading,	Reading,	September 21-24.
Do.	Keystone Agricultural Society,	S. H. Haffne, Kutztown,	Kutztown,	October 5-8.
Blair,*	Blair County Agricultural Society,	M. A. Young, Hollidaysburg,	Hollidaysburg,	September 14-16.
Bradford,*	Bradford County Agricultural Society,	J. A. Wilt, Towanda,	Towanda,	September 28-30.
Do.	Union Agricultural Association,	C. E. Riggs, Canton,	Canton,	September 21-23.
Do.	Troy Farmers' Club,	G. M. Card, Sylvania,	Troy,	September 14-17.
Bucks,*	Bucks County Agricultural Society,	W. Wynkoop, Newtown,	Holds no fair,	No fair.
Do.	Doylestown Agricultural and Mechanical Institute,	Thomas P. Miller, Doylestown,	Doylestown,	October 5-8.
Butler,*	Butler County Agricultural Society,	W. P. Roessing, Butler,	Butler,	September 14-17.
Do.	Connoquenessing Valley Agricultural Society,	J. W. Phillips, Zelienople,	Zelienople,	September 21-24.
Carbon,	Carbon County Industrial Society,	E. Bauer, East Mauch Chunk,	Lehighton,	September 21-24.
Centre,*	Centre County Agricultural Society,	H. H. Hershberger, Bellefonte,	Bellefonte,	No fair.
Chester,*	Chester County Agricultural Society,	A. M. Eachus, West Chester,	West Chester,	September 23-25.
Do.*	Oxford Agricultural Society,	T. K. Stubbs, Oxford,	Oxford,	Sept. 29—Oct. 1.
Do.	Octorora Agricultural and Horticultural Society,	D. H. Branson, Atglen,	Atglen,	No fair.
Do.	Westgrove Farmers' and Gardeners' Club,	M. Conard, West Grove,	Holds no fair,	No fair.
Do.	Octorora Farmers' Club,	D. H. Branson, Atglen,	Holds no fair,	No fair.
Clarion,	Clarion County Agricultural Society and Driving Park Association	Joseph H. Patrick, Clarion,	Clarion,	Sept. 28—Oct. 1.
Clearfield,	Clearfield County Agricultural Society,	A. Walters, Clearfield,	Clearfield,	Sept. 28—Oct. 1.
Clinton,*	Clinton County Agricultural Society,	H. W. Brown, Cedar Springs,	Holds no fair,	No fair.
Columbia,*	Columbia County Agricultural Society,	H. V. White, Bloomsburg,	Bloomsburg,	October 13-16.
Do.	North Columbia and South Luzerne Agricultural Association,	C. C. Evans, Berwick,	Berwick,	Sept. 28-30—Oct. 1.
Do.	Benton Agricultural Society,	J. S. Kline, Benton,	Benton,	October 6-9.
Crawford,*	Crawford County Agricultural Society,	A. J. Harper, Conneautville,	Conneautville,	Sept. 29—Oct. 1.
Do.	French Creek Valley Agricultural Society,	J. H. Adams, Cochranton,	Cochranton,	September 15-17.
Do.	Central Agricultural Society,	A. McMichael, Meadville,	Meadville,	No report.
Do.	Oil Creek Valley Agricultural Society,	J. B. Bramhill, Centreville,	Titusville,	September 21-24.

LIST OF COUNTY AND LOCAL AGRICULTURAL SOCIETIES—Continued.

Those marked with a * are represented in the Board of Agriculture by elected members.

COUNTY.	Corporate Name or Title of Society.	Name and Address of Secretary.	Where held.	When held.
Cumberland,*	Cumberland County Agricultural Society,	L. F. Lyne, Carlisle,	Carlisle,	Sept. 28—Oct. 1.
Do.	Cumberland County Horticultural Society,	E. C. Gardner, Mechanicsburg,	Holds no fair,	No fair.
Dauphin,*	Dauphin County Agricultural Society,	W. H. H. Sieg, Steelton,	Harrisburg,	No fair.
Do.	Gratz Agricultural Association,	J. Hoffman, Lykens,	Gratz,	Sept. 21-24.
Do.	Upper Dauphin Agricultural Society,	D. M. Ferree, Millersburg,	Millersburg,	No report.
Do.	Upper Dauphin Poultry Association,	J. S. Fennel, Lykens,	Lykens,	Ro report.
Delaware,*	Agricultural and Industrial Society of Delaware County,	H. C. Snowden, Media,	Elwyn,	No report.
Do.	Taxpayers' and Agricultural Society,	H. Darlington, Concord,	Holds no fair,	No fair.
Do.	Chadds' Ford Farmers' Club,	A. Sharpless, West Chester,	Holds no fair,	No fair.
Erie,*	Erie County Agricultural Society,	G. A. Evans, West Mill Creek,	Erie,	September 21-24.
Do.	Central Agricultural Society of Union City,	A. G. Sweet, Union City,	Union City,	No report.
Do.	North-West Agricultural Association,	John Smuty, Corry,	Corry,	Sept. 28—Oct. 1.
Do.	Edinboro' Agricultural Society,	R. B. Temple, Edinboro',	Edinboro',	No report.
Do.	Wattsburg Agricultural Society,	W. W. Harwood, Wattsburg,	Wattsburg,	October 5-7.
Fayette,	Fayette County Agricultural Society,	R. F. Hopwood, Uniontown,	Uniontown,	October 6-8.
Fulton,	Fulton County Agricultural Society,	J. W. Greathead, McConnellsburg,	McConnellsburg,	No fair.
Greene,	Greene County Agricultural and Manufacturing Society,	G. W. Daugherty, Carmichaels,	Carmichaels,	October 7-8.
Do.	Central Fair Association,	J. D. Lindsey, Waynesburg,	Waynesburg,	September 21-23.
Do.	Rich Hill Fair Association,	J. McGlumphey, Wind Ridge,	Jacksonville,	September 8-10.
Do.	Sandy Plains Fair Association,	Dr. F. S. Blackley, Clarksville,	Clarksville,	No fair.
Do.	Greene County Stock Association,	J. K. Bailey, Jr., Khedive,		No fair.
Huntingdon,	Huntingdon County Agricultural Society,	W. W. Moore, Huntingdon,	Huntingdon,	No fair.
Indiana,*	Indiana County Agricultural Society,	J. T. Stuchul, Indiana,	Indiana.	October 5-8.
Jefferson,*	Jefferson County Agricultural Society,	S. H. Whitehill, Brookville,	Brookville,	September 14-16.
Do.	Punxsutawney Agricultural Society,	T. J. Cooper, Punxsutawney,	Punxsutawney,	September 21-24.
Juniata,*	Juniata County Agricultural Society,	J. P. Wharton, Port Royal,	Port Royal,	October 13-15.
Lackawanna,*	Lackawanna County Agricultural Society,	D. W. Jones, Scranton,	Scranton,	September 14-17.
Do.	North Lackawanna Farmers' Association,	J. L. Stone, Waverly,	Waverly,	No fair.
Do.	North Abington Farmers' Club,	W. H. Northup, Glenburn,	Holds no fair,	No fair.
Do.	South Abington Farmers' Club,	J. L. Stone, Waverly,	Waverly,	No fair.
Lancaster,*	Lancaster County Agricultural Society,	M. D. Kendig, Creswell,	Holds no fair,	No fair.
Do.	Lancaster County Agricultural Fair Association,	J. B. Long, Lancaster,	Lancaster,	Aug. 30—Sept. 4.
Lawrence,*	Lawrence County Agricultural and Horticultural Society,	W. T. Butz, New Castle,	New Castle,	No fair.
Do.	Harlansburg Agricultural Association,	W. F. Leathers, New Castle,	Harlansburg,	No report.
Lebanon,*	Lebanon Valley Agricultural and Mechanical Association,	C. R. Lantz, Lebanon,	Lebanon,	September 14-17.
Lehigh,*	Lehigh County Agricultural Society,	L. P. Hecker, Allentown,	Allentown,	Sept. 27—Oct. 1.
Luzerne,*	Luzerne County Agricultural Society,	S. W. Townsend, Wilkes-Barre,	Wyoming,	September 21-24.
Do	Wyoming Horticultural Society,	W. H. Jenkins, Wyoming,	Wyoming,	No report.
Lycoming,*	Lycoming County Agricultural Society,	J. B. Caryell, Williamsport,	Williamsport,	No fair.
Do.	Muncy Valley Farmers' Club,	W. Crawford, Hughesville,	Holds on fair,	No fair.
McKean,	McKean County Agricultural Society,	A. J. Hughes, Port Allegheny,	Port Allegheny,	September 7-10.
Mercer,	Mercer County Agricultural Society,	J. P. Hines, Stoneboro',	Stoneboro',	September 28-30.

Mercer,*	Mercer Central Agricultural Society,	**W. J. McKean, Mercer,**	**Mercer,**	**September 22-24.**
Do.	Shenango Valley Agricultural Society,	**W. T. Alan, Greenville,**	**Greenville,**	**No fair.**
Do.	Keystone and Buckeye Agricultural Society,	T. B. Biel, Sharon,	**Sharon,**	**No report.**
Do.	Jamestown Agricultural Society,	W. Gambel, Jonestown,	**Jamestown,**	**No report.**
Mifflin,	Mifflin County Agricultural Society,	S. L. McKinney, Lewistown,	**Lewistown.**	**No fair.**
Monroe,	Monroe County Agricultural Society,	T. M. McIlhanany, Stroudsburg,	**Stroudsburg,**	**No fair.**
Montgomery,*	Montgomery County Agricultural Society,	J. Rex, Upper Dublin,	**Ambler,**	**No fair.**
Do.	Montgomery, Berks and Chester Agricultural Society,	E. P. Ancona, Pottstown,	**Pottstown,**	**September 28-30.**
Montour,*	Montour County Agricultural Society,	W. M. Gearhart, Danville,	**Danville,**	**No report.**
Do.	Northern Montour Agricultural Society,	C. E. Shires, Washingtonville,	**Washingtonville,**	**October 19-22.**
Northampton,*	Northampton County Agricultural Society,	E. T. Greenawalt, Nazareth,	**Nazareth,**	**October 5-8.**
Do.	Farmers' and Mechanics' Institute,	W. G. Field, Easton,	**Easton,**	**September 14-17.**
Northumberland,*	Northumberland County Agricultural Society,	P. H. Moore, Sunbury,	**Sunbury,**	**No report.**
Do.	Milton Driving Park and Fair Association,	W. B. Chamberlain, Milton,	**Milton,**	**Sept. 29—Oct. 2.**
Do.	Pleasant Valley Farmers' Club,	J. W. Kelsey, Milton,	**Holds no fair,**	**No fair.**
Philadelphia,	Philadelphia County Agricultural Society,	A. R. Montgomery, Andalusia,	**Holds no fair,**	**No fair.**
Do.	Germantown Horticultural Society,	E. Lonsdale, Germantown,	**Germantown,**	**No fair.**
Potter,	Potter County Agricultural and Horticultural Society,	A. B. Mann, Coudersport,	**Coudersport,**	**Sept. 29—Oct. 1.**
Do.	Potter County Fair Association,	A. S. Lyman, Coudersport,	**Coudersport,**	**No report.**
Schuylkill,*	Schuylkill County Agricultural Society,	G. H. Yeager, Orwigsburg,	**Orwigsburg,**	**Sept. 28—Oct. 1.**
Do.	Ringtown Agricultural Society,	L. Applegate, Shenandoah,	**Ringtown,**	**September 15-18.**
Snyder,	Union Agricultural Association,	M. Weitzel, Selinsgrove,	**Selinsgrove,**	**No report.**
Somerset,*	Somerset County Agricultural Society,	J. H. Fritz, Somerset,	**Somerset,**	**No fair.**
Sullivan,*	Sullivan County Agricultural Society,	E. A. Strong, Dushore,	**Dushore,**	**October 6-8.**
Susquehanna,*	Susquehanna County Agricultural Society,	D. A. Titsworth, Montrose,	**Montrose,**	**September 22-28.**
Do.	Harford Agricultural Society,	L. Tiffany, Harford,	**Harford,**	**September 28-29.**
Do.	Great Bend Agricultural Society,	C. McKinney, Great Bend,		**No report.**
Tioga,*	Tioga County Agricultural, Mechanical and Industrial Association	Mart King, Mansfield,	**Mansfield,**	**No report.**
Do.	Farmers' Agricultural Society of Tioga County,	J. W. Mather, Wellsboro',	**Wellsboro',**	**September 21-24.**
Union,*	Union County Agricultural Society,	Reuben Klone, Lewisburg,	**Lewisburg,**	**September 22-24.**
Venango,*	Venango County Agricultural Society,	J. Miller, Franklin,	**Franklin,**	**September 7-10.**
Warren,	Warren County Agricultural Society,	A. S. Dalrymple, Warren,	**Warren,**	**September 7-9.**
Do.*	Union Agricultural Society of Warren County,	D. B. Jagger, Sugar Grove,	**Sugar Grove,**	**September 14-16.**
Do.	Warren County Agricultural Association,	W. Cowan, Warren,	**Warren,**	**September 7-10.**
Washington,*	Western Pennsylvania Agricultural Association,	A. G. Happer, Washington,	**Washington,**	**September 14-17.**
Do.	Chartiers Valley Agricultural Society,	T. M. Potts, Cannonsburg,	**Cannonsburg,**	**No fair.**
Do.	Union Agricultural Association,	W. Melvine, Burgettstown,	**Burgettstown,**	**October 5-7.**
Do.	Washington County Stock-Breeders' Association,	J. B. Wilson, Washington,	**Holds no fair,**	**No fair.**
Do.	Sandy Plains Fair Association,	J. Emory, Millsboro',	**Holds no fair,**	**No fair.**
Wayne,*	Wayne County Agricultural Society,	T. J. Ham, Honesdale,	**Honesdale,**	**September 8-10.**
Do.	Jones Lake Farmers' Club,	P. W. Collins, Ariel,	**Holds no fair,**	**No fair.**
Westmoreland,	Westmoreland County Agricultural Society,	J. B. Laux, Greensburg,	**Greensburg,**	**October 12-15.**
Wyoming,*	Wyoming County Agricultural Society,	J. W. Piatt, Tunkhannock,	**Tunkhannock,**	**September 8-10.**
Do.	Nicholson Agricultural Society,	**N. P. Wilcox, Nicholson,**	**Nicholson,**	**No fair.**
York,*	York County Agricultural Society,	**E. Chapin, York,**	**York,**	**October 5-8.**
Do.	Hanover Agricultural Society,	**Mo. Smith, Hanover,**	**Hanover,**	**Sept. 28—Oct. 1.**

OFFICIAL REPORTS OF COUNTY

	Corporate or Official Title.	Date of organization.	Average cost of fall fairs.	Average attendance at fall fairs.
1.	Adams County Agricultural and Horticultural Society,	1861	$1,800	. . . .
2.	Armstrong County Agricultural and Horticultural Association,	1880	3,000	5,000
3.	(Armstrong county,) Petroleum Agricultural Association,	1881	700	6,000
4.	Berks Agricultural and Horticultural Society,	1852	5,500	40,000
5.	(Berks county,) Keystone Agricultural and Horticultural Society,	1869	. . . .	. . . .
6.	Blair County Agricultural Society,	1873	2,300	. . . .
7.	Bradford County Agricultural Society,	1858	. . . .	. . . .
8.	(Bradford county,) Troy Farmers' Club,	1874	. . . .	5,000
9.	(Bucks county,) Doylestown Agricultural and Mechanical Institute,	1860	6,500	20,000
10.	(Bradford county,) Union Agricultural Association,	1880	700	4,000
11.	Butler County Agricultural Society,	1877	8,500	20,000
12.	(Butler county,) Connoquenessing Valley Agricultural Society,	1874	750	6,000
13.	Carbon County Agricultural Society,	1875	775	5,000
14.	Chester County Agricultural Society,	1852	. . . .	10,000
15.	(Chester county,) Oxford Agricultural Society,	1870	875	11,000
16.	Clarion County Agricultural Society,	1888	. . . .	8,000
17.	Columbia County Agricultural and Horticultural Society,	1855	1,500	30,000
18.	Columbia, Northern, and Southern Luzerne Society,	1884	. . . .	6,500
19.	Dauphin County Agricultural Society,	1879	2,500	10,000
20.	Erie County Agricultural Society,	1876	5,500	20,000
21.	(Erie county,) North-Western Agricultural Association,	1870	1,500	. . . .
22.	(Erie county,) Wattsburg Agricultural Association,	1884	800	3,000
23.	Greene County Agricultural Society of Carmichaels,	1850	. . . .	. . . .
24.	(Greene county,) Richhill Fair Association,	1886	200	3,000
25.	Indiana County Agricultural Society,	1855	3,500	14,000
26.	Jefferson County Agricultural Society,	1879	5,800	20,000
27.	Lackawanna County Agricultural Society,	1881	5,000	14,000
28.	Lawrence County Agricultural and Horticultural Society,	1879	3,200	25,000
29.	Lebanon Valley Agricultural and Horticultural Association,	1881	8,000	10,000
30.	Lehigh County Agricultural Society,	1852	2,000	60,000
31.	Luzerne County Agricultural Society,	1857	700	3,000
32.	McKean County Agricultural Society,	1888	150	1,200
33.	Mercer County Agricultural Society,	1867	2,000	10,000
34.	(Mercer county,) Mercer Central Agricultural Society,	1883	2,500	10,000
35.	Montgomery, Berks and Chester Agricultural and Horticultural Society,	1885	8,000	25,000
36.	(Montour county,) Northern Montour Agricultural Society,	1871	2,500	10,000
37.	Northampton County Agricultural Society,	. . .	. . . .	. . . .
38.	Northampton County, Farmers' and Mechanics' Institute of,	1855	3,700	2,000
39.	(Northumberland county,) Milton Dairy Park and Fair Association,	1885	600	10,000
40.	Susquehanna County Agricultural Society,	1846	1,000	5,000
41.	Sullivan County Agricultural Society,	1878	750	2,000
42.	(Schuylkill county,) Ringtown Agricultural Society,	1879	1,600	5,000
43.	Farmers' Agricultural Society of Tioga County,	1878	2,500	10,000
44.	Venango County Agricultural Society,	1880	2,500	10,000
45.	Warren County Agricultural Society,	1884	3,000	5,000
46.	Warren County Fair Association,	1884	8,000	10,000
47.	Warren County, Union Agricultural Society of,	1874	700	5,000
48.	Western Pennsylvania Agricultural Association of Washington County,	1885	10,000	. . . .
49.	Washington County, Union Agricultural Association of,	1856	. . . .	12,000
50.	Westmoreland County Agricultural Society,	1885	4,500	5,000
51.	Wyoming County Agricultural Society,	1876	1,500	8,000
52.	(York county,) Hanover Agricultural Society,	1884	800	12,000

AGRICULTURAL SOCIETIES.

On what plan conducted.	Number of shares of stock.	Par value of stock per share.	Present value of stock per share.	Number of acres inclosed.	How controlled—owned or leased.	Amount of premiums on farm products.	Amount of premiums on farm machinery.	Amount of premiums on household crops.	Amount of premiums for trials of speed.	Average receipts from fall fairs.	Amount of premiums of fall fairs.	Amount of bounty from county.	Number.
Stock,	140	$50	....	27	Owned,	....	...	....	....	....	....	$100	1
Stock,	460	10	$10 00	85	Leased,	$1,500	D	$800	$1,000	$8,000	$2,500	100	2
Stock,	500	5	5 00	12	Leased,	800	D	100	700	1,500	800	...	3
Mutual,	....	...	....	40	Leased,	424	D	886	1,000	8,000	8,000	100	4
Mutual,	....	...	....	15	Owned,	200	$200	150	....	650	....	...	5
Stock,	....	1	1 00	80	Leased,	....	...	....	....	700	....	...	6
....	....	...	....	18	Owned,	....	...	....	....	8,000	....	100	7
Mutual,	....	...	....	20	Leased,	....	D	....	200	900	....	50	8
Stock,	2,600	10	5 00	85	Owned,	60	900	900	2,100	6,500	6,500	100	9
Stock,	280	10	10 00	20	Owned,	....	...	....	....	....	....	...	10
Stock,	189	25	25 00	24	Leased,	700	D	500	1,000	8,500	2,500	100	11
Stock,	200	10	5 00	14	Leased,	600	D	800	500	8,000	....	...	12
Stock,	500	20	15 00	21	Owned,	210	60	110	810	2,000	700	...	13
Stock,	1,225	10	8 00	22	Owned,	2,000	D	700	1,800	5,000	8,200	100	14
Stock,	760	10	8 00	22	Owned,	950	D	600	600	8,250	2,050	100	15
Stock,	800	20	20 00	25	Owned,	....	...	....	....	....	4,000	100	16
Mutual,	....	10	10 00	16	Owned,	700	D	600	700	....	2,000	...	17
Stock,	448	10	10 00	28	Owned,	....	25	....	860	....	2,400	...	18
Stock,	875	5	....	20	Leased,	800	D	200	500	2,000	1,500	100	19
Stock,	....	1	....	40	Leased,	600	60	800	200	....	1,500	100	20
Stock,	....	5	....	...	Leased,	....	...	....	....	4,000	2,000	...	21
Stock,	800	8	5 00	20	Leased,	800	D	100	140	900	600	...	22
Stock,	....	1	1 00	8	Owned,	100	100	100	100	800	800	...	23
Stock,	400	5	5 00	8	Owned,	600	200	200	150	1,000	1,500	...	24
Mutual,	....	...	....	12	Owned,	1,600	50	800	425	8,600	2,500	100	25
Stock,	287	10	5 00	12	Leased,	450	100	200	1,600	6,000	2,500	...	26
Stock,	560	25	25 00	25	Leased,	1,140	200	100	1,050	6,000	2,800	100	27
Stock,	1,000	10	7 50	87	Owned,	210	125	860	1,200	6,000	2,550	...	28
Stock,	290	20	20 00	10	Leased,	....	...	....	1,500	4,000	1,500	100	29
Stock,	785	10	25 00	13	Owned,	1,955	272	1,868	739	7,000	4,285	100	30
Stock,	80	15	15 00	50	Leased,	100	100	100	800	....	700	100	31
Stock,	25	100	100 00	17	Owned,	400	100	100	620	600	1,200	...	32
Stock,	600	10	10 00	28	Owned,	1,200	D	150	350	2,800	1,700	100	33
Stock,	1,000	50	50 00	41	Owned,	900	50	800	350	2,800	....	...	34
Stock,	500	10	10 00	67	Leased,	920	D	250	1,900	8,800	8,071	...	35
Stock,	6	150	150 00	15	Leased,	400	75	200	550	2,800	1,500	...	36
Stock,	825	10	10 00	...	....	....	...	....	....	....	....	100	37
Stock,	1,000	25	20 00	87	Owned,	79	58	241	1,500	....	878	...	38
Stock,	240	25	25 00	17	Leased,	....	...	....	900	2,900	1,420	..	39
Mutual,	....	...	....	20	Owned,	200	100	200	....	....	800	100	40
....	....	...	....	6	Leased,	500	...	200	....	....	700	100	41
Stock,	500	4	4 00	17	Owned,	250	50	100	600	1,850	1,000	...	42
Mutual,	....	...	....	15	Leased,	800	150	800	500	....	1,500	100	43
Stock,	8,000	1	1 00	80	Leased,	....	...	....	....	....	....	100	44
Mutual,	....	...	....	11	Leased,	....	...	....	500	5,000	2,000	100	45
Mutual,	....	...	....	22	Leased,	1,200	800	500	1,400	7,700	8,000	100	46
Mutual,	....	...	....	20	Leased,	....	...	....	....	2,000	1,200	100	47
Stock,	400	50	50 00	42	Owned,	....	...	....	....	....	....	...	48
Mutual,	....	...	....	18	Leased,	45	90	425	888	8,185	2,000	100	49
Stock,	40	50	50 00	50	Leased,	1,500	...	800	1,500	5,000	8,900	100	50
Stock,	65	25	25 00	26	Leased,	1,000	200	200	500	2,500	....	...	51
tock,	420	25	22 00	28	Owned,	600	...	500	1,500	4,000	2,900	...	52

TABULATED ANALYSES OF COMMERCIAL FERTILIZERS ISSUED BY THE STATE BOARD OF AGRICULTURE, 1886.

From samples selected by the Secretary of the Board, or its agents in accordance with the provisions of the act of June 28, 1879. Analyses by Prof. F. A. GENTH, University of Pennsylvania, West Philadelphia. Valuations are based upon an allowance of 8 cents per pound for soluble and reverted phosphoric acid; 5 cents for insoluble phosphoric acid from bone; 4 cents in mixed fertilizers which derive it mainly from tankage, fish, &c., and 2 cents when derived from South Carolina Rock; potash, 5 cents, and ammonia, 17 cents per pound.

All correspondence relating to the correctness of the analyses should be directed to Doctor F. A. Genth, as above; all relating to the correctness of the samples, should be directed to the Secretary of the Board at Harrisburg, Pa. Attention to this will prevent vexatious delay to correspondents.

It should be remembered that the column of "Comparative Commercial Value," is obtained by multiplying the number of pounds of each element in a ton by the market price per pound in the market at the commencement of the fertilizer year, August 1; hence, this column makes no allowance for freight, commissions, &c.

The reader is cautioned against making a comparison between the "Comparative Value" of this list and those which preceded it. The fall in the prices of fertiliser supplies has compelled us to lower the prices allowed per pound, and hence any such comparison would not only be unfair to the manufacturer, but would also mislead the reader. In making such comparisons the reader should see that the values at the heading of both lists are the same.

Complete Fertilizers.

Record number.	NAME OF FERTILIZER.	NAME AND ADDRESS OF MANUFACTURER.	Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Insoluble Phosphoric Acid.	Potash.	Ammonia.	Comparative Commercial Value per ton.	Record number.
484	Ammoniated Bone Phosphate,	E. K. Bollinger, Seitzland, Pa.,	4.84	3.49	2.07	1.20	1.88	$20 08	484
486	Unicorn Ammoniated Phosphate,	Clark's Cove Guano Company, New Bedford, Conn.,	4.48	3.76	4.07	2.85	2.53	27 91	486
487	Pensula Guano,	Miller, Lippincott & Co., Baltimore, Md.,	0.03	3.73	20.75	0.07	0.40	23 94	487
488	Favorite Superphosphate,	Popplein Silicated Phosphate Company, Baltimore, Md.,	2.26	5.78	5.85	0.14	1.18	21 65	488
489	Climax Superphosphate,	Hubbard Bros., Baltimore, Md.,	3.75	5.06	1.71	1.16	1.29	21 01	489
490	"B. G." Ammoniated Bone,	Baltimore Guano Company, Baltimore, Md.,	5.26	3.53	2.65	1.74	1.36	22 55	490
491	Powhattan Wheat Fertilizer,	Lorentz & Ritter, Baltimore, Md.,	6.35	2.74	3.63	1.65	1.71	25 10	491
492	Victoria Bone,	Joshua Walker, Baltimore, Md.,	4.97	6.99	0.24	0.19	0.17	20 06	492
493	Economical Ammoniated Bone,	" " " "	3.39	5.59	0.77	1.21	1.90	22 66	493
495	Susquehanna Alkaline Bone,	Susquehanna Fertilizer Company, Baltimore, Md.,	5.96	3.43	1.74	1.47		17 21	495
496	Ammoniated Bone Phosphate,	" " " " "	5.67	3.52	3.47	0.83	1.49	23 38	496
497	Dissolved Bone Phosphate,	Boyer & Lechleder, Hagerstown, Md.,	0.55	2.31	3.42	1.25	0.88	10 84	497
498	Dissolved Animal Bone,	Ramsburg Fertilizer Company, Frederick, Md.,	8.06	3.12	5.76	0.14	2.42	20 86	498
499	Old Virginia Compound,	Ramsburg Fertilizer Company, Frederick, Md.,	5.99	2.20	2.44	1.87	2.86	26 79	509
500	Ammoniated Bone,	Symington Bros. & Co., Baltimore, Md.,	8.01	2.69	0.85	1.12	2.44	27 21	500
501	Special Compound B,	" " " " "	4.33	2.44	0.42	0.91	0.06	12 70	501
502	Bone and Potash,	" " " " "	7.94	3.01	0.54	1.01		18 75	502
504	Standard Ammoniated Bone Phosphate,	John Sholl, Hanover, Pa.,	3.96	2.67	4.13	2.58	1.57	21 83	504
506	Dissolved Bone Potash,	G. Ober, Sons & Co., Baltimore, Md.,	7.71	5.03	2.53	2.27	2.66	33 71	506
507	Farmer's Standard Phosphate,	" " " " "	6.28	5.08	1.89	1.74	1.64	27 01	507

508	Soluble Ammoniated Phosphate,	“ “ “ “ “	6.42	2 73	2 62	2 02	2 90	28 62	508
509	Baker's Standard Guano,	Chemical Company of Canton, Baltimore, Md.,	4.82	3.58	3 63	2 48	2.36	26 84	509
512	W. G. Jewel, for Wheat and Grass,	Parks & Co., Baltimore, Md.,	7.44	4.03	2 04	1.05		20 22	512
513	Dissolved Animal Bone and Potash,	John A. Livers, Gettysburg, Pa.,	6.51	3 48	2 37	2 23	1.56	25 41	513
515	Excelsior Plant Food,	Ramsburg Fertilizer Company, Frederick, Md.,	7.54	2.93	3 42	0.76	2.33	28 17	515
516	Ammoniated No. 2 Phosphate,	F. Mehring, York Road, Md.,	5.57	3.05	4.04	1.22	3.41	29 83	516
518	Reliable Bone Phosphate,	J. A. Klinefelter, Glenville, Pa.,	4.43	2 34	3.21	1.67	2.91	24 96	518
519	Soluble Alkaline Bone,	“ “ “ “	5.87	4 55	4 80	2.66		21 25	519
521	Royal Bone Phosphate,	Williams, Clark & Co., New York,	4.42	2 96	2 27	1 63	1 39	20 04	521
522	J. I. C. Ammoniated Phosphate,	A. R. Brodbeck, Baltimore, Md.,	7.29	4 45	0 92	2.14	3 28	32 81	522
523	Soluble Flour of Bone,	P. S. Chappell & Son, Baltimore, Md.,	6.57	1 90	1 38	1 55	2.07	23 24	523
524	Success Fertilizer,	Lister Bros., Newark, N. J.,	11 23	1.23	0 33	1.28	2 51	30 05	524
525	Whitelock Vegetator,	Miller, Lippincott & Co., Baltimore, Md.,	8 87	3.05	2.23	0.61	2 79	30 95	525
526	Ammoniated Superphosphate,	P. S. Chappell & Son, Baltimore, Md.,	8.03	1 64	1.23	1 50	2.42	26 18	526
527	Ammoniated Soluble Bone Phosphate,	D. Blocher & Co., Baltimore, Md.,	3 79	3.94	2 17	1.73	0 41	17 23	527
528	Standard Pure Bone Phosphate,	Lister Bros., Newark, N. J.,	8.21	1.83	1.09	1.66	3.20	29 47	528
529	Hill and Drill Phosphate,	Bowker Fertilizer Company, New York,	8 33	2.17	2 33	1.62	2.21	27 27	529
530	Pen Mar Ammoniated Bone Phosphate,	W. Davidson & Co., Baltimore, Md.,	4 59	3 55	4.91	2 56	1.47	24 51	530
531	York (B) Ammoniated Raw Bone Phosphate	A. R. Brodbeck, Baltimore, Md.,	4.53	3 59	4.64	2.68	1.47	24 06	531
532	High Grade Phosphate,	D. Blocher & Co., Baltimore, Md.,	6.16	4.65	2.88	1.19	2.21	28 30	532
533	Harvest Queen Phosphate,	Lister Bros., Newark, N. J.,	12.40	1.29	0.33	0 75	1 20	26 99	533
534	Zell's Economizer,	Zell Guano Company, Baltimore, Md.,	8 16	3 56	1.35	1.27	1.45	26 03	534
537	Ammoniated Dissolved Bone Phosphate,	Lister Bros., Newark, N. J.,	8 34	3.99	0.95	1.55	2.71	31 25	537
538	Windsor Phosphate,	Natural Product from Virginia,		0 18	0 10	0.15	0 09	81	538
540	Planet Phosphate,	Peninsular Fertilizer Company, Smyrna, Del.,	5.71	3 92	3.21	3 19	1 65	27 45	540
541	Dissolved Animal Bone,	J. W. Stonebreaker & Co., Hagerstown, Md.,	5.67	11.11	2 04	0.19	3 36	40 11	541
542	Keystone Phosphate,	Thomas Whann, Jr., Chester Springs, Pa.,	6.25	3.33	3 08	1.57	2.29	27 14	542
544	Locust Point Compound,	G. Ober, Sons & Co., Baltimore, Md.,	3.93	7 05	2.96	2.07	1.85	28 30	544
545	Ammoniated Superphosphate,	F. Mehring, York Road, Md.,	5 65	4.98	4 57	0 73	1.25	25 57	545
546	Queen City Phosphate,	L. L. Crocker Co., Buffalo, New York,	8.69	2.06	0.51	1.36	2 00	25 77	546
547	Powell's Dissolved Bone,	Brown Chemical Company, Baltimore, Md.,	6.59	4 31	3 33	0 24	2 38	28 47	547
549	United States Phosphate,	Lister Bros., Newark, N. J.,	4.88	3 60	0 81	3.16	2.11	24 47	549
551	Twenty-Six Dollar Phosphate,	F. Mehring, York Road, Md.,	4.60	5 08	5 94	0 70	1 43	25 94	551
552	Powell's Tip-Top Bone Fertilizer,	Brown Chemical Company, Baltimore, Md.,	3.98	4.66	3.67	1 03	2.21	25 30	552
555	Linden Phosphate,	Maryland Fertilizer Company, Baltimore, Md.,	8 07	3.85	1 77	1.10		20 88	555
557	Horse Shoe Ammoniated Dissolved Bone,	N. W. Fertilizer Company, Chicago, Ill.,	6 18	2 62	4 36	0.22	2.45	26 60	557
558	Ammoniated Phosphate,	L. L. Crocker Co., Buffalo, N. Y.,	8.39	2.44	1.07	0.90	4.37	33 95	558
559	Powell's Bone and Potash,	Brown Chemical Company, Baltimore, Md.,	6 36	5 65	1.65	0.62		20 50	559
560	Dissolved Raw Bone,	F. Mehring, York Road, Md.,	6 98	12.32	0.63		1.97	38 08	560
562	Horse Shoe Garden City Phosphate,	N. W. Fertilizer Company, Chicago, Ill.,	5.71	3.62	4 38	0.20	3 65	31 04	562
563	Good Crop Phosphate,	Caldwell, Durham & Co., Williamsport, Pa.,	3.10	4 39	2 80	1.36	2.44	23 58	563
564	Excelsior Planet Food,	Ramsburg Fertilizer Company, Frederick, Md.,	7.14	3.68	4.05	1 00	2 10	28 69	564
566	Animal Bone Phosphate,	C. H. Miller & Son, Sellersville, Pa.,	3.33	3.08	5.97	3.12	1.05	21 73	566
567	Raw Bone Phosphate,	“ “ “ “ “	5.24	3.21	4.65	0.93	3.07	28 61	567
573	Peruvian Guano,	Christian & Co., Philadelphia, Pa.,	3.71	4.81	5.55	2.16	10.40	55 59	573
574	Complete Bone Phosphate,	Allentown Manufacturing Company, Allentown, Pa.,	6.15	3.24	1 92	2.19	2 26	25 43	574
575	American Phosphate,	Williams, Clark & Co., New York,	8 06	3 07	0.20	1.29	3.18	30 07	575
576	Phuine,	Estate Moro Phillips, Philadelphia, Pa.,	4.62	3.42	3.91	1.51	2 14	24 78	576
578	Ammoniated Dissolved Bone,	Williams, Clark & Co., New York,	7.39	3 17	0.49	1 77	2.32	26 95	578
581	Complete Bone Phosphate,	Allentown Manufacturing Company, Allentown, Pa.,	6 79	3.40	2 24	2.19	2 33	28 20	581
582	Dissolved Animal Bone,	Baugh & Sons, Philadelphia, Pa.,	3.73	11.49	1.38		3 28	36 65	582
583	Twenty-Seven Dollar Phosphate,	M. A. J. Springer, Wilmington, Del.,	5.65	2.69	1.02	2 41	2.10	23 71	583
584	Standard Fertilizer,	Church & Co., Tiverton, R. I.,	6.97	1.51	2 09	3.51	3.93	32 11	584

TABULATED ANALYSES OF FERTILIZERS—Continued.

Record number.	NAME OF FERTILIZER.	NAME AND ADDRESS OF MANUFACTURER.	Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Insoluble Phosphoric Acid.	Potash.	Ammonia.	Comparative Commercial Value per ton.	Record number.
585	Fish and Potash Fertilizer,	Church & Co., Tiverton, R. I.,	3.31	2.61	0.39	3.27	3.85	26 48	585
589	Rising Sun Phosphate,	Lancaster Chemical Company, Lancaster Pa.,	6.19	3.74	0 74	1.93	2.35	26 39	589
590	Buffalo Ammoniated Phoshate,	L. L. Crocker Co., Buffalo, N. Y.,	8.24	2.28	1.25	1.16	4 08	32 83	590
591	Mapes Complete Manure (A),	Mapes Formula Company, New York,	6.28	4 70	2.89	2.81	3.41	34 28	591
592	Rectified Phosphate,	W. C. Newport & Co., Willowgrove, Pa.,	7.66	4.01	3.89	4.67	3.30	37 67	592
593	Grass and Grain Top Dressing,	Mapes Formula Company, New York,	7 45	3.29	2 03	5.62	4.62	46 89	593
594	Swift Sure Phosphate,	M. L. Shoemaker Company, Philadelphia, Pa.,	9.84	3.17	1.83	3.60	1.23	36 86	594
595	Guaranteed Guano,	Estate Moro Phillips, Philadelphia, Pa.,	6.46	3.41	1.95	1.22	1.64	24 14	595
596	Double Eagle Phosphate,	Baugh & Sons, Philadelphia, Pa.,	6.56	2.23	3.93	0.37	2.84	27 23	596
597	German (A) Guano,	W. C. Newport & Co., Willowgrove, Pa.,	9.27	2.49	2 40	4.95	2.32	33 65	597
598	Complete Manure for general use,	Mapes Formula Company, New York,	9 44	1.98	1.07	4.18	4 49	38 58	598
599	Burkholder & Wilson's Phosphate,	H. F. Hager, Richland Centre, Pa.,	6 11	4.50	1.39	1 58	1.86	25 99	599
600	Twenty-Three Dollar Phosphate,	M. L. Shoemaker Company, Philadelphia, Pa.,	8 01	3.65	1.70	1.68	1.58	27 07	600
601	Soluble Pacific Guano,	Glidden & Curtis, Boston, Mass.,	7.21	2.38	2 97	1.86	3.60	31 62	601
602	Nitrogenized Phosphate,	Mapes Formula Company, New York,	5.90	4 27	2.67	2 03	2 72	29 65	602
603	Azotized Bone Phosphate,	J. Richmond, Philadelphia, Pa.,	5.26	4.04	2 01	1.66	2.18	25 56	603
604	Ammoniated Soluble Bone,	W. C. Newport & Company, Willowgrove, Pa.,	7.38	5.66	3.44	0.19	1.35	28 39	604
605	No. 1 Bone Phosphate,	Sharpless & Carpenter, Philadelphia, Pa.,	4.37	2.65	3.42	1 92	1 61	21 36	605
606	Cereal Bone Phosphate,	J. Richmond, Philadelphia, Pa.,	5.11	4.73	2.26	1.31	1.73	24 72	606
609	E. F. Coe's Bone Phosphate,	E. Frank Coe, New York,	7.95	5.08	1 07	1.40	3 11	33 63	609
611	Pure Bone Phosphate,	J. Cope & Co., Lincoln University, Pa.,	5.39	6.27	1.13	2 05	2.31	31 16	611
612	Q. & L. Phosphate,	Waring Fertilizer Company, Colora, Md.,	6.11	5.39	5.44	1 30	2.30	32 37	612
617	Knickerbocker Phosphate,	John Ralston, New York,	7.28	3.22	2.82	0.67	2.02	26 40	617
619	Improved Superphosphate,	Estate Moro Phillips, Philadelphia, Pa.,	6 83	3.62	1.63	2 14	2.56	28 86	619
621	Complete Ammoniated Bone Phosphate,	J. Gawthrop & Co., Kennett Square, Pa.,	3.41	3.42	2.30	3.39	1.80	22 30	621
625	Ammoniated Bone Phosphate,	J. Cope & Co., Lincoln University, Pa.,	5.17	4 08	4.75	1 62	1.56	25 62	625
626	High Grade Phosphate,	D. Blocker & Co., Baltimore, Md.,	6.48	4.94	2 58	1.14	1.95	28 10	626
627	Ammoniated Bone Phosphate,	Windle, Doan & Co., Coatesville, Pa.,	4.84	5.53	3.19	0 20	2.03	26 21	627
628	Cook's Bone Phosphate,	" " " " "	6.54	6.19	2.03	1.81	2.00	30 60	628
632	Cumberland Fertilizer, Grade No. 1,	Cumberland County Fertilizer Company, Carlisle, Pa.,	0.97	6.28	4 67	1 52	1 24	21 08	632
634	Bowker's Ammoniated Dissolved Bone,	Bowker Fertilizer Company, New York,	9.54	2.48	2 28	1 24	1.62	27 80	634
635	Cumberland Fertilizer, Grade (C),	Cumberland County Fertilizer Company, Carlisle, Pa.,	4 81	5.86	0 64	1 92	1.98	26 28	635
636	Homestead Phosphate,	Michigan Carbon Works, Detroit, Mich.,	8.01	3 38	1.12	0 96	3 23	31 06	636
637	Jarves Drill Phosphate,	" " " " "	6.21	2.51	2 64	0.17	1.99	23 00	637
638	Quaker City Phosphate,	J. J. Allen's Sons, Philadelphia, Pa.,	6.39	5.12	4 48	0.22	2.12	29 48	638

639	**Soluble Guano,**	Hubbard Bros., Easton, Md.,	0.88	5.06	0.97	0.12	0.11	28 22	639
640	**Cumberland Fertilizer**, Grade (G),	Cumberland County Fertilizer Company, Carlisle, Pa.,	5.58	7.02	1.22	3.34	3.20	35 67	640
641	Alkaline Bone,	E. Frank Coe, New York,	7.45	4.12	2.09	2.76	1.20	27 02	641
642	Pure Bone Phosphate,	Susquehanna Fertilizer Company, Baltimore, Md.,	8.01	7.28	2.72	0.54	1.55	32 45	642
643	Bollinger's Superphosphate,	E. K. Bollinger, Seitzland, Pa.,	4.44	9.52	2.03	1.79	0.83	28 57	643
647	Pure Raw Bone Phosphate,	Jacob Trinley, Limerick Station, Pa.,	4.69	7.01	2.04	3.61	4.29	38 55	647
648	Acidulated Fish Guano,	N. J. Chemical Company, Philadelphia, Pa.,	6.58	3.47	2.79	0.93	2.54	27 89	648
649	Star Bone Phosphate,	J. E. Tygert & Co., Philadelphia, Pa.,	6.29	4 82	1.73	2.16	2.22	28 08	649
651	Lobos Peruvian Guano,	Christian & Co., Philadelphia, Pa.,	0.69	7.84	7.77	3.02	4.69	38 68	651
652	Swift Sure Dissolved Bone,	M. L. Shoemaker Company, Philadelphia, Pa.,	9.10	5.73	4.36	0.25	3.85	40 56	652
656	Wrapper Leaf Phosphate,	Baugh & Sons, Philadelphia, Pa.,	3.73	5.23	2.68	6.89	4.27	37 97	656
657	W. & C. Phosphate,	N. J. Chemical Co., Philadelphia, Pa.,	6 92	2.51	2.72	1.73	2.48	27 26	657
658	Dissolved Bone Phosphate,	J. E. Tygert & Co., Philadelphia, Pa.,	8 01	5.64	3.24	0.19	3.10	35 16	658
659	Twenty-five Dollar Phosphate,	Baugh & Sons, Philadelphia, Pa.,	6 44	2.65	3.50	0.53	2.91	27 76	659
662	Button Bone Fertilizer,	N. J. Chemical Company, Philadelphia, Pa.,	5.60	5.43	2.40	1.85	1 75	27 87	662
664	No. 1 Peruvian Guano,	Christian & Co., Philadelphia, Pa.,	3 19	5.90	5.37	1.91	8.95	51 18	664
665	Pure Dissolved Bone,	Baugh & Sons, Philadelphia, Pa.,	5.23	7 92	4.40	. .	3.15	38 27	
666	Victor Bone Fertilizer,	N. J. Chemical Company, Philadelphia, Pa.,	3.72	3.89	1.84	2.30	1.86	21 96	666
667	Dissolved Bone Black,	J. E. Tygert & Co., Philadelphia, Pa.,	13.06	0.83	0.43	0 07	.	30 63	667
668	Good Enough Phosphate,	M. L. Shoemaker & Co., Philadelphia, Pa.,	9.53	2 95	1.98	1.57	2.15	30 43	668
670	Tried and True Phosphate,	Provident Fertilizer Company, Philadelphia, Pa.,	3.30	4 79	3.21	2.38	1.83	24 43	670
672	Soluble Bone and Potash,	N. J. Chemical Company, Philadelphia, Pa.,	8.59	4.77	1.54	2 53	. .	24 51	672
674	Echo Phosphate,	M. L. Shoemaker & Co., Philadelphia, Pa.,	6.46	3.74	0.96	1.70	3.48	30 62	674
679	Swift Sure Phosphate,	" " " " "	9.36	2 91	1.80	4.04	3.33	36 43	679
680	A A Nitrogen,	**Baugh & Sons, Philadelphia, Pa.,**	. .	. .	4.06		13 15	49 77	680
681	No. 1 Bone Phosphate,	Sharpless & Carpenter, Philadelphia, Pa.,	4.41	4.03	3.20	2.54	1.47	23 60	681
682	Noberque Guano,	**Pacific Guano Company, Boston, Mass.,**	8.17	3.42	2.90	1.67	2 20	30 08	682
684	Soluble Pacific Guano,	" " " " "	7.18	3.09	2.65	1 37	3.34	31 29	684
685	Dissolved Bone,	**Sharpless & Carpenter, Philadelphia, Pa.,**	4.82	9 62	3.16	0.16	2.02	34 70	685
686	Ammoniated Dissolved Bone,	**M. L. Shoemaker Company, Philadelphia, Pa.,**	3.95	6.79	4.82	0.52	1.74	27 48	686
687	Twenty-Three Dollar Phosphate,	" " " " "	6.43	3.62	1.13	2 01	1.71	24 80	687
688	Champion Fertilizer,	**Lord & Polk, Odessa, Del.,**	4.98	3.54	2.10	3.24	1.08	25 11	688
689	Normal Phosphate,	**I. P. Thomas, Cheyney, Pa.,**	6.33	4.10	1.34	1 40	1.78	25 21	689
690	Truxillo Guano,	**Lord & Polk, Odessa, Del.,**	7.54	2.71	1.16	6.59	8 78	36 76	690
691	Peach Tree Phosphate,	" " "	2.81	4.68	2.23	9.11	2.47	31 25	691
693	Diamond State Phosphate,	" " "	6.30	1.62	5.28	2.80	2.52	23 85	693
695	Granger Fertilizer,	**Granger Fertilizer Company, Philadelphia, Pa.,**	4.82	3.70	6.70	1.67	2.79	23 45	695
697	Farmers' High Grade Phosphate,	Davison & Scarlett, Greencastle, Pa.,	6.22	4 45	3.02	2.19	1.80	26 80	697
700	Chester Valley Phosphate,	W. E. Whann, Atglen, Pa.,	4.76	4 44	4 09	1.87	1.57	25 19	700
701	Flag Brand Phosphate,	Lancaster Chemical Company, Lancaster, Pa.,	4.36	4.55	2.48	1.76	1.25	24 19	701
704	Shell Phosphate, (lime,)	S. S. Myers, Philadelphia, Pa.,	. .	. .	0.19	0.18	0.26	1 23	704
706	Johnstown Phosphate,	**Walter Dibert & Co., Johnstown, Pa.,**	1.33	3.81	4.94	0.63	1.12	16 66	706
707	Eagle Phosphate,	" " " " "	2.23	5.13	4.79	1.26	1.15	20 73	707
708	Standard Phosphate,	**Keystone Fertilizer Company, Johnstown, Pa.,**	1.86	7.85	7.43	2.10	3 72	35 55	708
709	Lion Phosphate,	" " " " "	1.87	7.15	5.05	0 53	6.13	39 81	709
711	Dissolved Bone,	**Bowker Fertilizer Company, Boston, Mass.,**	9.08	2.07	2.03	0.65	2.73	29 49	711
712	Hill and Drill Phosphate,	" " " " "	8 57	1.85	2.30	0.91	1 39	25 69	712
714	Corn and Oats Fertilizer,	**Chesapeake Guano Company, Baltimore, Md.,**	4.74	7.40	1.34	2.54	1.14	26 91	714
715	Ammoniated Bone Phosphate,	" " "	6.33	4.53	3.47	0.61	1.74	26 69	715
717	Ammoniated Alkaline Phosphate,	" " "	4.01	5 34	4 06	1 38	2.01	26 53	717
718	Chesapeake Guano,	" " "	3.62	6.31	3.14	1.52	2.55	28 58	718

Acidulated S. C. Rock.

Record number.	NAME OF FERTILIZER.	NAME AND ADDRESS OF MANUFACTURER.	Soluble Phosphoric Acid.	Reverted Phosphoric Acid.	Insoluble Phosphoric Acid.	Comparative commercial value per ton.	Record number.
494	Dissolved S. C. Phosphate,	Joshua Walker, Baltimore, Md.,	5.02	6.30	3.15	$19 61	494
503	Soluble Bone,	A. R. Brodbeck, Baltimore, Md.,	8.02	3.57	4.27	22 25	503
505	Farmer's Soluble Dust Phosphate,	John A. Livers, Gettysburg, Pa.,	10.11	3.79	2.30	23 82	505
511	Dissolved Bone Phosphate,	Chemical Company of Canton, Baltimore, Md.,	7·81	6.25	2.05	23 47	511
520	S. C. Bone,	Lorentz & Ritter, Baltimore, Md.,	10.57	3.33	5.02	24 89	520
535	Superior Rock Phosphate,	Susquehanna Fertilizer Company, Baltimore, Md.,	7.41	6 09	2.29	22 52	535
536	Bowker's Phosphate,	Bowker Fertilizer Company, Baltimore, Md.,	12.63	3.41	2.51	26 66	536
539	Dissolved S. C. Rock,	Chemical Company of Canton, Baltimore, Md.,	8.01	5.24	3.12	22 45	539
543	Dissolved S. C. Bone,	E. Snowden, Baltimore, Md.,	9.04	5.44	1.07	23 96	543
550	Soluble Bone,	J. Richmond, Philadelphia, Pa.,	4.54	9.04	2.31	23 55	550
553	Diamond State Soluble Bone,	Lord & Polk, Odessa, Del.,	8.64	6.24	2.47	24 80	553
554	Acidulated Phosphate,	J. Richmond, Philadelphia, Pa.,	9 96	5.46	1.98	25 46	554
556	Acidulated Phosphate,	F. Mehring, York Road, Md.,	7.06	5 96	4.33	22 56	556
565	Dissolved S. C. Bone,	Dambmann Bros. & Co., Baltimore, Md.,	0.99	4.42	2.70	24 16	565
568	Dissolved S. C. Bone,	Chemical Company of Canton, Baltimore, Md.,	8.09	5 57	1.94	22 64	568
572	Acidulated Phosphate,	New Jersey Chemical Company, Philadelphia, Pa.,	0.44	6.40	2.02	26 15	572
579	Soluble Rock Phosphate,	Allentown Manufacturing Company, Allentown, Pa.,	10.31	3.80	3.75	24 08	579
586	Acorn Acidulated Phosphate,	Williams, Clark & Co., New York,	8.78	6.82	2.05	25 94	586
587	Yearsley's Acidulated Phosphate,	United States Chemical Company, Philadelphia, Pa.,	5.05	7.06	2.78	20 83	587
588	High Grade Acid Phosphate,	E. Frank Coe, New York,	6.84	6.12	4.07	21 72	588
614	T. & P. Acid Phosphate,	Waring Fertilizer Company, Colora, Md.,	8.71	5.80	3.40	24 53	614
616	Acid Phosphate,	Walton, Whann & Co., Wilmington, Del.,	7.38	5.31	4.17	21 97	616
618	Dissolved S. C. Phosphate,	Sharpless & Carpenter, Philadelphia, Pa.,	8.60	5.27	3.35	22 73	618
623	Dissolved S. C. Rock,	J. Cope & Co., Lincoln University, Pa.,	9.20	4 75	3.40	23 63	623
631	Philadelphia Standard Phosphate,	U. S. Chemical Company, Philadelphia, Pa.,	4.93	7.41	3.13	21 04	631
645	Superior Rock Phosphate,	Susquehanna Fertilizer Company, Baltimore, Md.,	9.68	4.94	5.63	25 56	645
653	Acidulated Phosphate,	N. J. Chemical Company, Philadelphia, Pa.,	9.40	4.09	1.52	22 83	653
654	Dissolved S. C. Rock,	J. E. Tygert & Co., Philadelphia, Pa.,	12.04	2.91	1.40	25 04	654
655	Dissolved S. C. Rock,	M. L. Shoemaker Company, Philadelphia, Pa.,	0.00	6.18	1.12	24 75	655
661	Dissolved S. C. Rock,	Sharpless & Carpenter, Philadelphia, Pa.,	11.58	2.78	4.06	24 60	661
673	Acid Phosphate,	Baugh & Sons, Philadelphia, Pa.,	8.57	4.06	4.64	21 99	673
678	Dissolved Bone,	Pacific Guano Company, Boston, Mass.,	9.18	6.30	2.60	26 41	678
692	Diamond State Soluble Bone,	Lord & Polk, Odessa, Del.,	8.78	5.63	2.77	24 20	692
696	Keystone Concentrated Phosphate,	Keystone Chemical Company, Philadelphia, Pa.,	0.83	43.89	5.49	73 74	696
698	Dissolved S. C. Rock,	Lancaster Chemical Company, Lancaster, Pa.,	7.29	7 66	0.61	21 16	698
716	Dissolved Bone Phosphate,	Chesapeake Guano Company, Baltimore, Md.,	7.55	7.70	0.54	24 62	716

Ground Bone.

Record number.	Name of Fertilizer.	Name and Address of Manufacturer.	Insoluble Phosphoric Acid.	Ammonia.	Comparative Commercial Value, per ton.	Record number.
543	Pure Ground Bone,	Thomas Whann, Jr., Chester Springs, Pa.,	21.89	4.50	$36 69	543
561	Export Bone,	Baugh & Sons, Philadelphia, Pa.,	17.82	3.93	30 63	561
570	Button Bone,	L. Moritz, Philadelphia, Pa.,	23.04	4 83	41 49	570
571	Button Bone,	Emil Wahl, Philadelphia, Pa.,	25.80	4.77	42 11	571
580	Pure Bone Meal,	Williams, Clark & Co., New York,	13.88	5.11	36 25	580
607	Pure Bone Meal,	Sharpless & Carpenter, Philadelphia, Pa.,	24.61	4.58	40 19	607
608	Pure Bone Dust,	W. C. Newport & Co., Willowgrove, Pa.,	23.50	5.09	40 90	608
613	Pure Ground Bone,	Sharpless & Carpenter, Philadelphia, Pa.,	19.60	4.15	33 71	613
615	Pure Ground Bone,	Sharpless & Carpenter, Philadelphia, Pa.,	21.34	4.64	37 12	615
622	Fine Ground Bone,	J. Gawthrop & Co., Kennett Square, Pa.,	19.78	4.20	34 06	622
624	Bone Meal,	Baugh & Sons, Philadelphia, Pa.,	20.29	4.2[illegible]	34 81	624
629	Pure Ground Bone,	Windle, Doan & Co., Coatesville, Pa.,	20.47	5.13	37 91	629
630	Pure Ground Bone,	E. M. Weaver, Boyd's Mills, Pa.,	22.62	5.18	40 13	630
633	Banner Raw Bone,	Michigan Carbon Works, Detroit, Mich.,	18.57	3.83	31 59	633
644	Pure Ground Bone,	Susquehanna Fertilizer Company, Baltimore, Md.,	22.46	4.54	37 00	644
650	Bone Meal,	Baugh & Sons, Philadelphia, Pa.,	21.80	4.65	37 61	650
660	Swift Sure Bone Meal,	M. L. Shoemaker Company, Philadelphia, Pa.,	19 83	7.63	45 82	660
669	Pure Bone Meal,	Sharpless & Carpenter, Philadelphia, Pa.,	20.72	5.23	38 50	669
671	Swift Sure Ground Bone,	M. L. Shoemaker Company, Philadelphia, Pa.,	18.37	8.17	43 15	671
675	Ground Bone,	J. E. Tygert & Co., Philadelphia, Pa.,	26.28	4.22	40 97	675
677	Button Bone,	Emil Wahl, Philadelphia, Pa.,	24.00	5.11	41 37	677
693	Pure Ground Bone,	Sharpless & Carpenter, Philadelphia, Pa.,	18.75	4.20	33 03	693
694	Bone Meal,	Lord & Polk, Odessa, Del.,	20.16	4.03	36 07	694
705	Bone Dust,	Walter Dibert & Co., Johnstown, Pa.,	23.53	4.04	30 84	705
710	Raw Bone,	Keystone Fertilizer Company, Johnstown, Pa.,	21.47	4.60	37 11	710

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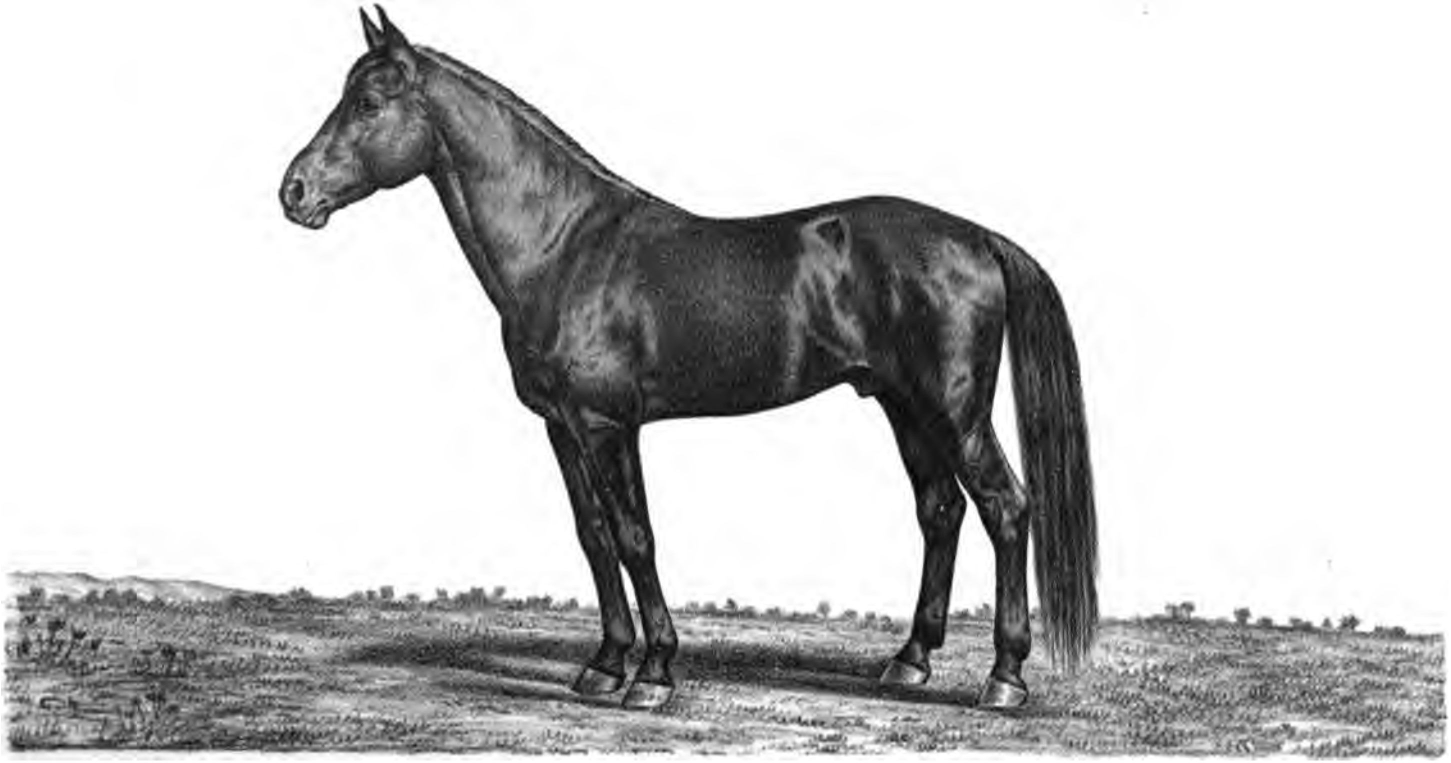

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MINUTES OF THE TRANSACTIONS

OF THE

PENNSYLVANIA

STATE AGRICULTURAL SOCIETY,

1886.

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Allen, Charles, do.
Armstrong, Wm. H., do.
Allen, John H., Montourstown.
Ayres, J. J., Williamsport.
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Armstrong, W. H., Easton.
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Childs, S. S., Harrisburg.
Commings, Charles. do.
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Dasher, David, Harrisburg.
Driesbach, Daniel G., Beach Haven.
Davis, William L., Easton.
Dunlap, H. E., Newberry.
Davis, John L., do.
Datesman, Robert, Milton.
De Haven, Jehu, Harrisburg.
Dempster, Robert, Phillipsburg, N. J.
Duncan, J. L., M. D., Pittsburgh.
Dewees, John, Shamokin.
Darlington, H., Pittsburgh.
Davis, Joseph H., do.
Dull, J. J., Harrisburg.
Deitz, George A., Chambersburg.
Du Barry, J. N., Harrisburg.
Dillingham, J. B., West Chester.
Diehl, J. E., Beverly, N. J.
Dykeman, G. R., Shippensburg.
Dickey, Samuel, Oxford, Chester co.
Doyle, James B., Philadelphia.

Eli. Richard E., Philadelphia.
Evans. David, do.
Ellis, William, do.
Evans, John, York.
Eichbaum, William. Pittsburgh.
Eberly, Christian. Cumberland.
Everhart, J. T., Pittston.
Engle, Charles K., Bustleton.
Early, Martin, Palmyra.
Eddy, George W., Philadelphia.
Ensworth, N. A. Williamsport.
Eves. George S., do.
Embick, Frederick E., do.
Eldred, Charles D., do.
Elder, Mathias, do.
Edwards, Charles, do.
Elliott, William G., do.
Eveland, S. D., do.
Evender, Thomas, do.
Eppes, William J., do.
Elser, D. B., do.
Evans, Robert, Erie.
Ever, Andrew, Muncy.
Elliott, B. A. Pittsburgh.
Elliott, W. R., do.
Estep, J. P., do.
Etter, B. F., Harrisburg.
Emminger. John, Hogestown.
Early, D. S., Hummelstown.
Egle, W. H., M. D., Harrisburg.
Ensminger, J. T., do.
Englebert, A. F., Wiconisco.

Fager, George C., Harrisburg.
Fertig, John, Titusville.
Freas, P. R.. Germantown.
Frantz, Jacob, Mount Hope, Lancaster co.
Foster, Frank T., Philadelphia.
Failes. George. do.
Flenniken, J. C., Waynesburg, Greene co.
Felton, S. M., Philadelphia.
Fulton, Andrew, Pittsburgh.
Fleming, Robert, Williamsport.
Fessler, Philip, do.
Foresman, Robert M., do.
Fisher, John S.. do.
Foresman, D. W., do.
Foresman, John, do.
Foresman, Daniel F., Slifer, Union co.
Foresman, R. S., Williamsport.
Fuller, J. W., Montoursville.
Farrell, John, Pittsburgh.
Fass, G., Allegheny City.
Frisch, B., Harrisburg.
Fisler, J. E., do.
Fisler, Amos, do.
Flickinger, Samuel, do.
Fiske, A. R.. do.
Farnum, J. E., Piladelphhia.
Filler, John H.. Harrisburg.
Farrell, John, Philadelphia.
Fowzard, Mons. J., Chateau Roy, France.

Grout, H. T., Philadelphia.
Grigg, John Warner, do.
Glass, Alexander F., do.
Goodin, M., do.
Garrett, Walter E., do.
Garber, Jacob B., Columbia.
Gillespie, James, Philadelphia.
Gould, J. E., do.
Gross, Daniel W., Harrisburg.
Gilbert, Henry, do.
Gardner, Jacob, Pittsburgh.
Goe, John S., Brownsville.
Goe, John S., junior, do.
Gould, Stephen, Williamsport.
Gould, John, Luzerne co.
Garis David, Easton.
Gilmore, Joseph, Williamsport.
Grier, James. Newberry.
Gibson, C. E., Williamsport.

Gould, Robert S., do.
Gibson, John, do.
Garman, Samuel, do.
Gould, Alexander S., Hickory Run, Lycoming co.
Gregg, Theodore, Bellefonte.
Guernsey H. A., Philadelphia.
Gaynor, Edward J., Easton.
Greenawalt, Alexander Allegheny City.
Glenn, John, McDonald, Pittsburgh.
Glenn, Robert W., Noblestown.
Grove, M. M., Harrisburg.
Gohl, A., do.
Garman, John, Hyde Park.
Griffin, Henry, Scranton.
Germyn, John, Rushdale.
Gibbs, J. W., M. D., Hyde Park.
Gregory, J. W., Scranton.
Griest, Chas. W., York Sulphur Springs.
Glatz, A. Hiestand, York.
Gowen, F. B., Philadelphia.

Houston, H. H., Philadelphia.
Hartman, F. O., do.
Hoopes, C. R., do.
Heaton, Wm., Jr., do.
Haldeman, Jacob S., New Market.
Hiester, A. O., Harrisburg.
Hutchinson, S. Pemberton, Philadelphia.
Hickok, W. O., Harrisburg.
Hazeltine, John, Philadelphia.
Hoopes, Thomas P., do.
Hamilton, A. Boyd, Harrisburg.
Hoffman, H. W., do.
Haddock, D., junior, Philadelphia.
Hall, George E., “
Hæhnlen, Frederick P., Harrisburg.
Hoffer, John, do.
Hamilton, Hays, Huntingdon Furnace.
Hicks, James, Pittston.
Hutchins, Thomas, Wyoming.
Hollenback, George M., Wilkes-Barre.
Hitner, Henry S., Barren Hill.
Holstein, William H., Bridgeport.
Hæhnlen, Jacob, Harrisburg.
Hackett, J. M., Easton.
Hetrick, Josiah P., do.
Hutter, William H., do.
Hartman, John, Williamsport.
Hartman, Mathias, Catawissa.
Hagerman, Augustus H., Williamsport.
Herdic, Peter, do.
Hill, Theodore, do.
Hall, John B., do.
Hudson, Joseph E., do.
Heidler, David, do.
Holden, H. L., do.
Hays, J. W., do.
Huling, G., do.
Hinkle, John R., Newberry.
Higgins, William C., Williamsport.
Huyck, George, Newberry.
Hull, Joseph F., Hull's Mill.
Hepburn, Andrew, Williamsport.
Harrington, Thomas L, do.
Heylman, E. G., Crescent, Lycoming co.
Howell, A., Williamsport.
Howland, Rausford, do.
Hastings, H. S., do.
Holliday, B. B., Wellsboro'.
Hepburn, John, Williamsport.
Hagy, Philip, do.
Hull, W. R., Cogan Station.
Hise, Adam, Williamsport.
Herriott, W. A., Oakdale, Allegheny co.
Hamilton, Cyrus E., Williamsport.
Hoffman, Philip, do.
Hester, Joseph M., Easton.
Hetrick, Reuben, do.
Higgins, William V., Williamsport.
Hemingway, E. E., Easton.
Hugus, P., Pittsburgh.
Higgins, William V., Williamsport.
Hummel, William, Harrisburg.
Hickman, Amos S., Monticello, Illinois.
Hynicka, George, Harrisburg.
Hummel, S. A., do.
Hæhnlen, William, do.
Hamilton, Hugh, do.
Hostic, John, do.
Herr, D. S., do.
Hall, John W., Baltimore, Md.
Heck, Lewis, M. D., Dauphin.
Hain, George, Lower Paxton, Dauphin co.
Hoffman, H. B., Millersburg.
Hunter, George W., Harrisburg.
Hildrup, W. T., do.
Halstead, N., Scranton.
Hill, J. F., do.
Hallstead, W. F., do.
Hinckley, Isaac, Philadelphia.

Ingersoll, Harry, Philadelphia.
Irwin, James, do.
Innis, John A., Easton.

Jayne, Eben C., Philadelphia.
Jordan, John, do.
Jeffords, A. H., Wyoming.
Jenkins, G. S., do.
Jenkins, Steuben, do.
Jones, Daniel, Exeter, Luzerne co.
Johnston, William, Easton.
Jones, John E., Williamsport.
Jarrett, John, Hepburn, Lycoming co.
Jones, Samuel, Williamsport.
Jamison, Edward, Newberry.
Jamison, L., Williamsport.
Jeter, Tinsley, Bethlehem.
Jones, B. F., Pittsburgh.
Jordan, Thomas J., Philadelphia.
Jones, W. H., Philadelphia.

Kitterlinus, J. M., Philadelphia.
Kent, E. E., Syracuse, N. Y.
Kendig, John, Philadelphia.
Knight, W., 1316 Seventh street, Phila.
Kennedy, A. L., M. D., do.
Kapp, Amos E., Northumberland.
Kramer, Philip, Philadelphia.
Knight, William K., do.
Kimball, Stephen, do.
Knight, Edward C., do.
Keller, John S., Orwigsburg.
Kunkle, Benjamin S., Harrisburg.
Knapp, D. B., Williamsport.
King, C. M., White Deer Mills, Centre co
Kinyon, S. C., Williamsport.
Kunsman, William H., Easton.
King, Alexander, Pittsburgh.
Kreybill, Jacob E., Marietta.
Knipe, Joseph F., Harrisburg.
Koller, Henry M., do.
Kuhn, William. do.
Keely, Jerome, Union Deposit, Dauphin co.
Kirby, William C., Harrisburg.
Kepple, John, do.
Kirkpatrick, John D., North Liberty, Mercer co.
Kennedy, Thomas B., Chambersburg.

Keim, George de B., Philadelphia.
Kinny, L., do.
Kimball, J. M., Erie.

Landreth, S. P., Bristol.
Landreth, Leopold, do.
Landreth, Burnet, Jr., Bristol.
Landreth, Oliver, do.
Leeser, Frederick K., Philadelphia.
Levering, A. D., Philadelphia.
Lukenbaugh, Charles Augustus, Bethlehem.
Longstreth, John, Bristol.
Languerrene, P. L., Philadelphia.
Lafrance, Isaac T., Wyoming.
Lee, Washington, Jr., Wilkes-Barre.
Leacock, J. R., Wyoming.
Longaker, A. Brower, Allentown.
Line, J. M., Allentown.
Lawall, Edward, Easton.
Lerch, Frederick, do.
Logan, Millard F., Williamsport.
Lowe, Elias S., do.
Love, Samuel, do.
Lyon, Thomas. do.
Lippincott, Edward, do.
Lentz, George W., do.
Lehman, M., do.
Levan, E., M. D., do.
Long, Henry B., Pittsburgh.
Long, W. J., Osceola, Clearfield co.
Lamberton, Robert A., Harrisburg.
Lemon, John A., Hollidaysburg.

Moore, Andrew M., Philadelphia.
Moore, G. M., do.
Mundell, John, do.
MacKellar, Thomas, do.
Marvin, Selden, Erie.
Marshall, William, Bellefonte.
Miles, James, Girard, Erie co.
Mellor, Thomas, Philadelphia.
Mellon, Thomas, do.
Magee, James, do.
McCully, Francis G., do.
McKean, H. P., do.
McKean, Samuel M., Williamsport.
Martin, George H., Philadelphia.
McCrea, William H., do.
McIntyre, Peter, York.
McFarland, John, Ligonier.
Middleton, E. P., Philadelphia.
Muhlenberg, H. H., Reading.
McDowell, John, Washington.
McAllister, Archibald, Springfield Furnace, Blair co.
Metzger, William, Harrisburg.
Murdock, A. C., Pittsburgh.
Merrick, George, Northumberland.
Myers, Henry, Forty Fort.
Marcy, Ira, Wilkes-Barre.
Martin, Dewees J., Allentown.
Mutchler, John, Easton.
McMinn, J. M., Williamsport.
Mudge, Hiram, do.
Monday, S. S., do.
McLowell, Lewis, do.
McCormick, Robert, Montoursville.
Moore, Wesley, Newberry.
Mahaffey, David, Cogan Station.
Mahaffey, Lindsey, Newberry.
McMicken, J. B., Williamsport.
Miller, Larr. Wayne, Clinton co.
Mahaffy, William J., Newberry.
Maxwell, Jacob S., Williamsport.
Morse, H. S., Williamsport.
Montgomery, J. B., do.
Munday, H. F. do.
Morrison, S. G., do.
Messinger, Samuel, Easton.
McCain, Daniel, Allegheny City.
McKelvey, James, Wilkinsburg, Allegheny co.
Morris, D. B., Pittsburgh.
McPherson, J. S., Wilkins.
McNish, A. L., Pittsburgh.
Marchard, John, Pittsburgh.
Magan, David, New Brighton, Beaver co.
Montgomery, Joseph, Harrisburg.
Motter, John, do.
Mark, George M., do.
Middleton, Richard, do.
Mumma, David, do.
McFarland, George F., do.
McConkey, Elbridge, do.
McDonald, Lewis, do.
Miller, J. G., do.
Morse, L. W., Ledgedale, Wayne co.
Moore, E. B., West Chester.
McKean, J. S., Pittsburgh.
Miller, John M., Hickory, Washington co.
McPherson, Edward, Gettysburg.
Monaghan, R. E., West Chester.
Meyers, B. F., Harrisburg.
McClure, A. K., Philadelphia.
McCaughey, J. A., Downingtown.
Mackey, L. A., Lock Haven.

Neilson, Robert, Philadelphia.
Newton, G. B., Springfield, Delaware co.
Noble, F. W., Easton.
Nissley, John J., Hummelstown.
Nicely, George W., Newberry.
Nutting, Lyman, Pine Grove, Schuylkill co.
Nichols, Joseph, Williamsport.
Nichols, W. F., do.
Neilman, D. H., Easton.
Nissley, Joseph, Harrisburg.

Opp, George S., Maryland, Lycoming co.
Otstott, Jacob H., Harrisburg.
Odenwelder, Henry L., Easton.
Olewine, Benjamin, Harrisburg.
Ott, Leander N., Dauphin co.

Palmer, Henry, Avondale.
Pritchett, Borradaile, Frazier, Chester co.
Perott, W. S., Philadelphia.
Pennock, Samuel, Kennett Square, Chester co.
Pratt, Thomas, Philadelphia.
Pomroy, John L., do.
Peyson, Auguste, do.
Presbury, George G., Jr., Philadelphia.
Parsons, H. K., Harrisburg.
Patterson, Robert H., Pittsburgh.
Polen, Albert, Wyoming.
Peters, C. P., Concordsville.
Potts, E. Channing, Norristown.
Parsons, Leroy, Harrisburg.
Pyle, R. C., Easton.
Purcell, Sylvester, Bloomsburg.
Parsons, Henry C., Williamsport.
Pollock, Samuel, do.
Porter, John F., Newberry.
Parker, Samuel J., Williamsport.
Perkins, H. J., do.
Perkins, James E., Lemar.
Parke, John E., Pittsburgh.

Page, A., Williamsport.
Post, G. S., do.
Patterson, Lebanon Church, Allegheny co.
Phelps, W. H., Pittsburgh.
Pemberton, Clifford, Pittsburgh.
Phillips, John, Pittsburgh.
Parsons, George W., Harrisburg.
Postlethwaite, E. T., Philadelphia.
Patterson, John, Glenmore, Chester co.
Paxson, J. A., Philadelphia.

Rogers, C. R., Philadelphia.
Runk, W. M., do.
Rogers, C. B., Philadelphia.
Roberts, Algernon S., Philadelphia.
Rudman, William C., do.
Robeson, H. P., Robesonia, Berks co.
Rodgers, Fairman Philadelphia.
Rhodes, William A., do.
Rutherford, Abner, Harrisburg.
Reily, John A., do.
Rodd, Jacob, Pittsburgh.
Robinson, ——, Philadelphia.
Rutter, Nathaniel, Wilkes-Barre.
Ross, William S., do.
Rutherford, John B., Harrisburg
Ruggles, A. C., Williamsport.
Rutherford W. F., Paxton.
Reighard, James B., Newberry.
Reighard, Daniel, do.
Renninger, W. H., Williamsport.
Rook, D. N., do.
Rank, L. D., do.
Rouse, William A., Harrisburg.
Reed, Alexander, Lock Haven.
Rodenbough, Joseph S., Easton.
Reeder, Mrs. A. H., do.
Richards, Henry, do.
Reigel, Joseph, do.
Roth, Jeremiah, Allentown.
Rogers, Felix, Pittsburgh.
Rowley, Thomas A., Pittsburgh.
Rogers, Lucius, Smethport, McKean, co.
Raymond, James, Harrisburg.
Reel, Augustus, do.
Rutherford, William S., Harrisburg.
Reel, John, do.
Reed, James, Middle Paxton, Dauphin co.
Rudy, Joseph, Harrisburg.
Rutherford, F. W., Paxton.
Rupp, Henry S., Shiremanstown, Cumberland co.
Rutherford, J. E., Harrisburg.
Rhey, George, Millwood, Westmoreland co.
Richmond, William H., Carbondale.
Reed, E. W., Erie.
Rutherford, Silas, Paxton,
Rutherford, J. Q. A., Paxton.
Rutherford, S. Parke, Cochranville, Chester co.

Stanly, J. T., Philadelphia.
Smith, Mahlon K., do.
Smith, William B., Philadelphia.
Small, Henry, York.
Savery, Peleg B., Philadelphia.
Stambaugh, S. C., Lancaster.
Strouble, Jacob, Zion, Centre co.
Snow, Edward K., Philadelphia.
Sharp, Joseph W., do.
Smith, Daniel, Jr., do.
Scull, Gideon, do.
Silverthorn, M. H., Fairview, Erie co.
Starr, Isaac, Philadelphia.
Shoemaker, B. A., Philadelphia.
Speer, William W., Pittsburgh.
Spencer, S. S., Lancaster.
Swift, Joseph, Philadelphia.
Slade, Alfred, do.
Stuart, George H., do.
Small, Samuel, York.
Sturdevant, E. W., Wilkes-Barre.

Sheets, J. H. Von, Orwigsburg.
Shoemaker, William M., Wyoming.
Sturdevant, E. J., do.
Speece, L. B., do.
Smith, J. B., Dunmore.
Shoemaker, William S., Wyoming.
Schooley, J. B., do.
Smith, J. B., Plymouth.
Shoemaker, Elijah, Kingston.
Sharp, John Jr., Wyoming.
Stephens, Z., Scranton.
Sower, F. D., Norristown.
Schreiber, O. L., Laubach, Northampton co.
Sigman, Joseph, Easton.
Snyder, Daniel W., Easton.
Schreiner, J. W., Lewisburg.
Singer Manufacturing Company, Philadelphia.
Swan, Rufus C., Williamsport.
Sheffler, A. G., do.
Smith, Henry B., do.
Smith, Joseph W., Newberry.
Stearns, L. L., Williamsport.
Stewart, Robert, Lemar.
Showers, Jesse, Rauch Gap.
Smith, Thomas, Williamsport.
Showers, D. H., do.
Smith, Daniel W., do.
Saxton, J. O., New Kingston.
Shaw, Hugh, Jersey Shore.
Smith, J. D. L., Mill Hall.
Seltzer, George L., Myerstown.
Seitz, George, Easton.
Seitz, Frederick, Easton.
Serch, David, do.
Scott, John, Pittsburgh.
Sharpless, S. S., Street Road, Chester co.
Smith, George, New York city.
Seiler, Daniel W., Harrisburg.
Shoemaker, John, do.
Smith, Jacob, do.
Shaffer, William S., do.
Simon, John B., do.
Sheck, J. H., do.
Silkman, William M., Scranton.
Smith, H. K., Philadelphia.
Singerly, W. M., do.
Smith, George Handy, Philadelphia.
Steel, John M., Greensburg.
Steel, William, do.
Smith, Philip L., Philadelphia.
Shaner, Jefferson, West Chester.
Thompson, John I., Half Moon, Centre co.
Thatcher, Richard, Marsh, Chester co.
Thompson, N. B., Philadelphia.
Tatham, H. B., do.
Tatham, George N., do.
Towers, William H., do.
Taggart, David, Northumberland.
Tasker, Thomas T., Philadelphia.
Tripp, Ira, Scranton.
Tyson, Carroll S., Norristown.
Templin, James R. Easton.
Taylor, Benjamin H., Williamsport.

Taylor, Horace E., Williamsport.
Thompson, James, Cogan Station.
Trump, Edward D., Jersey Shore.
Tinsman, Garrett, Williamsport.
Tinseley, Jeter, Bethlehem.
Thayer, Russel A., Allentown.
Templin, William, Harrisburg.
Taylor, William, Womelsdorf, Berks co.
Taylor, B. Frank, do. do.
Taylor, George R., do. do.
Thomson, Frank, Philadelphia.
Twaddell, L. H., do.

Urquehart, John, Wilkes-Barre.
Updegraff, A., do.
Updegraff, Thomas, Newberry.
Updegraff, Daniel, do.
Updegraff, Derrick, do.
Unger, John G., Harrisburg.

Vollmer, Charles F., Philadelphia.
Van Leer, Isaac W., Wallace, Chester co.
Vouges, James C., Philadelphia.
Vanvoorhis, H. B., Pittsburgh.
Vanscoy, Daniel, Wyoming.
Van Vorce, John, Williamsport.
Van Buskirk, S., do.
Vandyke, James, Northumberland.

Wilhelm, J. Schall, York.
Wagner, Louis, Philadelphia.
Welsh, J. Lowber, do.
Whitman, Horace F., do.
Wanamaker, W. H., do.
Walker, R. J. C., Williamsport.
Walker, George, Montrose.
Watts, Frederick, Carlisle.
Walker, R. C., Elizabeth, Allegheny co.
Wood, Robert, Philadelphia.
Watson, Johanna, Philadelphia.
Welsh, Samuel, do.
Weaver, H. A., do.
Wright, Joshua, Findleyville, Washington co.

Waterman, Albert G., Philadelphia.
Wood, Thomas, Penningtonville.
Woodhams, Samuel, Plymouth.
Williams, Stiles, Wilkes-Barre.
Walter, Townsend, West Chester.
Wentz, Thomas H., Norristown.
Whitman, Joseph, Centre Valley P. O.
Williams, E. C., Harrisburg.
Woodward, John V., Williamsport.
Watson, Oliver, do.
Wolf, Peter, do.
Watson, Henry W., do.
Weaver, M. B., do.
Wait, B., do.
Wood, James M., do.
Wescott, Thos. S., Ashland, Schuylkill co.
Workheiser, Enos, Easton.
Wallace, W. W., Pittsburgh.
Washington, W. P., Shamokin.
Why, John, Jr., Pittsburgh.
Wallower, John, Harrisburg.
Wolfinger, Levi, do.
Wible, William, Gettysburg.
Wolf, William, Harrisburg.
Wilhelm, A., Cornwall.
Waggoner, John A., Harrisburg.
Wilson, D. Y., Gum Tree, Chester co.
Waller, D. J., Bloomsburg.

Young, Hiram, York.
Yeager, Joseph, Philadelphia.
Young, Alexander, do.
Yeaton, William H., do.
Youngman, George W., Williamsport.
Young, William, Easton.
Young, John, Jr., Ewing's Mills, Allegheny co.
Young, James, Middletown.

Ziegler, John H., Harrisburg.
Zimmerman, F., Williamsport.
Zimmerman, A. M., Harrisburg.
Zerbe, Cyrus, do.

ACT OF INCORPORATION AND BY-LAWS

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

AN ACT

To incorporate the Pennsylvania State Agricultural Society.

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same*, That George W. Woodward, James Irvin, E. A. Thompson, Frederick Watts, T. J. Bingham, and others, who have subscribed the constitution lately adopted by a convention assembled at Harrisburg, to improve the condition of agriculture, horticulture and the household arts, be and they are hereby created a body politic and corporate in law, by the name of "The Pennsylvania State Agricultural Society," and by that name shall have perpetual succession, and have capacity to sue and be sued, and may have a common seal, which at their pleasure may alter or renew; they may take by gift, grant, devise, bequest or otherwise, lands and tenements, goods and chattels, necessary for all the purposes for which the Society was instituted: *Provided*, The annual income therefrom shall not exceed ten thousand dollars, independent of annual contributions by members, and the same to convey, lay out, apply and dispose of, for the benefit of the said Society, as they under their charter and by-laws may direct.

SECTION 2. That the members of the said corporation shall have power to make and enforce such constitution and by-laws as may be necessary for the good government of the Society, and the same from time to time to revoke, alter and amend, as they may think proper: *Provided*, That the same shall not be inconsistent with the constitution and laws of this State.

SECTION 3. That the sum of two thousand dollars, out of any money in the treasury not otherwise appropriated, be and the same is hereby appropriated to the said Society; and annually hereafter a sum of equal amount to that paid by the members thereof into its treasury, affidavit of which fact, and the amount so raised by the treasurer of the Society, being first filed with the State Treasurer: *Provided*, Such sum shall not exceed two thousand dollars in any one year.

SECTION 4. That when any number of individuals shall organize themselves into an agricultural or horticultural society, or any agricultural or horticultural society now organized within any of the counties of this Commonwealth, shall have adopted a constitution and by-laws for their government, elected their officers, and raised annually, by the voluntary contribution of its members, any sum of money, which shall have been actually paid into their treasury, for the purpose of being disbursed for the promotion of agricultural knowledge and improvement, and that fact be attested by the affidavit of their president and treasurer, filed with the commissioners of the county, the said county society shall be entitled to receive annually a like sum from the treasurer of their said county: *Provided*, That said annual payment out of the county funds shall not exceed one hundred dollars: *Provided further*, That but one such society in any county shall be entitled to receive such appropriation in any one year, under this act.

SECTION 5. That the President of the Pennsylvania State Agricultural Society, who shall receive or expend any of the moneys hereby appropriated, shall, annually, on the first Monday of January, transmit to the Governor of the Commonwealth, a detailed account of the expenditure of all the moneys which shall come into his hands under this act, and stating to whom and for what purpose paid; and a copy of the said report shall be transmitted to the Legislature at as early a day as practicable, and the original shall be filed in the office of the Secretary of the Commonwealth. And the presidents of the several county agricultural societies shall annually transmit, in the month of December, to the Executive Committee of the Pennsylvania State Agricultural Society, all such reports or returns as they are required to demand and receive from applicants for premiums, together with an abstract of their proceedings during the year. This act shall at all times be within the power of the Legislature to modify, alter or repeal the same.

JOHN CESSNA,
Speaker of the House of Representatives.
BENJAMIN MATTHIAS,
Speaker of the Senate.

APPROVED—The twenty-ninth day of March, Anno Domini one thousand eight hundred and fifty-one.

WM. F. JOHNSTON.

CONSTITUTION AND BY-LAWS

OF THE

PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

The name of the society shall be the Pennsylvania State Agricultural Society. The objects of this society are to foster and improve agriculture, horticulture, and the domestic and household arts.

WHO ARE MEMBERS.

SECTION 1. The society shall consist of all such persons as shall pay to the treasurer not less than two dollars, and annually, thereafter, not less that two dollars; and also, of honorary and corresponding members, the names of the members to be recorded by the secretary.

The officers of county agricultural societies in this State, or delegations therefrom, shall be members *ex-officio* of this society.

The payment of fifty dollars shall constitute life membership, and exempt the members so contributing from all annual payment.

OFFICERS.

SECTION 2. The officers of this society shall be a president, vice president from each congressional district, three-fourths of whom shall be practical agriculturists or horticulturists, a treasurer, a corresponding secretary, a recording secretary, a librarian, an agricultural chemist and geologist, and such assistants as the society may find essential to the transaction of its business; an executive committee, consisting of the above-named officers, five additional members, with the ex-presidents of the society, all of whom shall be elected at the annual meeting in January by the qualified members of the society.

OF THE PRESIDENT.

SECTION 3. The president shall have a general superintendence of all the affairs of the society.

FIRST VICE PRESIDENT.

That, at the annual election of this society, there shall be elected from one of the number of vice presidents, one of said officers to act as first vice president, whose duty it shall be to act as president in case of absence or the death of the president.

EX-PRESIDENTS.

That, whenever the number of ex-presidents exceeds five (5), the name receiving the lowest number of votes shall be the one dropped from the list of officers.

OF THE VICE PRESIDENTS.

It shall be the duty of the vice presidents to take charge of the affairs of the association in their several districts; to advance all its objects; to call upon farmers to report as to the condition of agriculture in their neighborhood; to ask for information as to the modes of cultivation adopted by different farmers; and, as far as in their power, to make known the resources of their districts, the nature of its soil, its geological character, and all such matter as may interest farmers in every part of the State.

TREASURER.

The treasurer shall keep an account of all moneys paid into his hand, and shall pay bills when audited and approved by the executive committee. Each order for payment must be signed by the president or chairman of the executive committee.

CORRESPONDING SECRETARY.

The duty of this officer shall be to invite a correspondence with all persons interested in agriculture, whether in the State of Pennsylvania or elsewhere, but especially with our consuls in foreign countries, that new seeds, vegetables, or live stock may be introduced, and their fitness for cultivation and propagation in our climate be tested. At each stated meeting of the society, he shall read his correspondence, which shall, either the whole, or such parts as may be selected by the society, form a portion of the transactions. He shall also correspond with the president or other officers of each state society in the United States, at least twice in the year, for the purposes of combined and mutual action, and to be informed of the results and progress of each other's efforts; also, to invite mechanics to forward models or implements for examination or trial.

RECORDING SECRETARY.

The recording secretary shall keep the minutes of the society and of the executive committee. At the close of each year he shall prepare for publication such parts of the minutes and transactions of the society as may be designated.

The recording secretary shall have power to approve of such bills and contracts as he is authorized to make and the treasurer shall pay the same.

LIBRARIAN.

The librarian shall take charge of all books, pamphlets, &c., belonging to the society, and shall act as curator to preserve seeds, implements, or whatever property the society may possess.

In case of the death of any of the officers of this society the president shall have the power to fill the vacancy by appointment until the next annual meeting of the society.

EXECUTIVE COMMITTEE AND QUORUM.

The executive committee shall transact the business of the society generally; shall superintend and direct the publication of such of the reports and transactions as they may deem proper, and shall designate the time and places for annual exhibitions, regulate the expenditures, examine all accounts, and kept such general charge of the affairs of the society as may best promote its interests.

They shall select their own chairman, and meet quarterly, and at any other time when convened by the president. Five members shall form a quorum.

They shall call special meetings of the society when necessary.

ANNUAL MEETING OF THE SOCIETY AND QUORUM.

SECTION 4. The society shall meet annually, on the third Wednesday of January, at Harrisburg, when all the officers of the society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. The polls shall be opened at 10 A. M., and close at 12 o'clock M., when the result of the election shall be announced. They shall also hold a general meeting at the time of the annual exhibitions, and special meetings whenever convoked by the executive committee.

Ffteen members shall form a quorum for the transaction of business, but no member in arrears shall be entitled to the privileges of the society.

QUALIFICATIONS OF VOTERS.

SECTION 5. No annual member hereafter shall be entitled to vote for the election of officers of the Pennsylvania State Agricultural Society unless he shall have been a member of the previous State fair, and in default of a State fair, then three months' previous membership shall be necessary.

SECTION 6. No one shall be eligible to office hereafter who has not obtained a right to vote under section five.

ALTERATIONS.

SECTION 7. This constitution may be altered or amended at the annual meetings in January, by a vote of two-thirds of the members in attendance.

All amendments to the constitution, to be voted upon at the anunal meeting of the society in January, must be submitted to the meeting of the executive committee in September preceding said annual meeting.

LIST OF PREMIUMS AWARDED BY THE PENNSYLVANIA STATE AGRICULTURAL SOCIETY.

Thirty-Second Annual Exhibition, Philadelphia, September 6–18, 1886.

GROUP I—Horses and Mules.

Grand Prize.

For best three colts for carriage, coach, and light draught purposes, the get of "Mambrino Hasson,"	$100 00

CLASS 1—Thoroughbred Horses, Mares, and Colts.

It is expressly understood that the subjoined prizes are not to be awarded to the weeds and refuse of racing stables, or such other animals (though they may possess purity of blood) as do not fulfil the requirements of the breeder. Animals entered in this class must be registered in the American Stud Book, or be qualified for entrance therein.

J. H. Lewis, Jr., Media, Pa., best stallion, five years and over, "Stampede," first premium, ...	$75 00
P. J. Stewart, Boot Tavern, Chester county, Pa., second best,	50 00
J. H. Lewis, Jr., best brood mare, with foal at her foot, "Blossom," first premium, ...	60 00
J. H. Lewis, Jr., best brood mare, four years and over, "Nannie Gentry," first premium, ...	50 00

M. H. Cryer,
Chairman.

CLASS 2—Standard Trotting Stallions, Mares, and Fillies.

Must be standard under the rules established by the National Association of Trotting Horse Breeders and must be entered in Wallace's Trotting Register, and in case of stallions must give registry number.

R. B. Konover & Boyd, Trenton, N. J., best stallion, five years and over, "Intrigue," first premium, ...	$75 00
Avondale Stock Farm, Avondale, Pa., second best, "Mogul," second premium, ...	50 00
Daniel G. Engle, Marietta, Pa., best stallion, between four and five years, "Storm King," first premium, ...	50 00
C. Frank Barrett, No. 1400 Frankford avenue, Philadelphia, second best, "Expectation," second premium, ...	40 00
Daniel G. Engle, best stallion, between two and three years, "Hi Henry," first premium, ...	30 00
C. Frank Barrett, second best, "Dr. Van," second premium,	20 00
Daniel G. Engle, best stallion, between one and two years, "Alcanace," first premium, ...	20 00
Daniel G. Engle, best brood mare with foal at her foot, "Canace," first premium, ...	60 00
H. N. Smith, Trenton, N. J., best brood mare, four years and over, "Rosalind," first premium, ...	50 00

Avondale Stock Farm, Avondale, Pa., second best, "Lou Livingston," second premium,	$30 00
Daniel G. Engle, best filly, two years, "Oxilla," first premium,	30 00
J. A. Wilson, Wilmington, Del., best filly, one year and under two, "Electra," first premium,	20 00
Daniel G. Engle, second best, "Rheta Almont," second premium,	15 00

SCALE OF POINTS.

	Class number.	Awards.	NAME.	SIRE.	DAM.	SIRE OF DAM.	Structure.	History.	Total.	Difference.
Class	15	First,	Intrigue,	Jay Gould,	Rosalind,	Abdallah, 15,	69.25	40.00	109.25	2.25
"	15	Second,	Mogul,	Administrator,	Mary A. Whitney,	Volunteer,	77.00	30.00	107.00	
"	16	First,	Storm King,	Happy Medium,	Topsey Taylor,	Norman, 25,	80.25	28.00	108.25	.25
"	16	Second,	Expectation,	Administrator,	Balm o' Gilead,	Thorndale,	83.00	25.00	108.00	
"	18	First,	Hi Henry,	Mambrino Dudley,	Virginia,	Volunteer,	84.75	40.00	124.75	31.75
"	18	Second,	Doctor Van,	Warlock,	Balm o' Gilead,	Thorndale,	66.00	27.00	93.00	
"	19	First,	Alcanace,	Ethan Allen, Jr., 473,	Canace,	Lord Coke,	80.25	20.00	100.25	....
"	20	First,	Canace,	Lord Coke,	Capitola,	Knickerbocker,	77.00	20.00	97.00	....
"	21	First,	Rosalind,	Abdallah, 15,	Burch Mare,	Brown Pilot,	84.00	63.00	147.00	38.50
"	21	Second,	Lou Livingston,	Happy Medium,	Constance,	Knickerbocker,	75.50	35.00	108.50	
"	23	First,	Oxilla,	Oxmoor,	Camilla,	Ashland,	75.50	20.00	95.50	....
"	24	First,	Electra,	Alcyone,	Maud S. T.,	Governor Sprague,	77.25	43.00	120.25	24.25
"	24	Second,	Rheta Almont,	Alecto,	Cleopatra II,	Motion,	76.00	20.00	96.00	

SCALE OF POINTS.

POINTS.	Perfection.	Expectation.	Storm King.	Mogul.	Intrigue.	Dr. Van.	Hi Henry.	Alcanace.	Canace.	Lou Livingston.	Rosalind.	Oxilla.	Electra.	Rheta Almont.
1—Head,	4	3.	2.75	2.75	3.	3.	3.	3.25	3.	2.50	3.25	2.75	3.50	2.
2—Eyes and ears,	4	3.25	3.	3.50	3.25	3.50	3.	3.25	3.	2.75	3.	3.	3.75	2.50
3—Neck,	6	5.	4.50	4.25	4.	4.	5.50	4.75	5.	3.50	5.	3.50	5.	3.50
4—Shoulders and fore-arms,	8	7.	6.	6.50	6.	6.	7.	6.	5.50	6.	7.25	7.25	6.50	6.
5—Barrel, back, and coupling,	10	8.	8.	8.	7.	7.50	8.75	8.50	8.50	7.75	8.	7.50	8.50	7.50
6—Hips, quarters, stifles, and gaskins,	12	10.	9.	9.50	8.	8.	10.	9.	8.	9.	10.	10.	9.50	9.
7—Hocks, knees, legs, and pasterns,	14	11.25	10.50	9.50	7.	9.	10.	9.	10.	8.50	11.	8.	9.	10.50
—Feet,	10	9.	9.	8.	7.	8.	9.	9.	9.	8.50	9.	9.	9.	9.
9—Color,	6	6.	6.	6.	6.	4.50	6.	5.	5.	6.	6.	5.	4.	6.
10—Size and substance,	10	8.50	9.	7.50	7.	8.	8.50	8.50	7.	8.50	8.50	8.50	8.	8.50
11—Symmetry and style,	8	6.	6.	5.	6.	4.	7.	7.	6.50	6.	6.	5.	5.50	6.
12—Action,	8	6.	6.50	5.50	5.	5.50	7.	7.	6.50	6.50	7.	6.	5.	5.50
13—Pedigree,	50	25.	25.	30.	40.	27.	40.	20.	20.	35.	38.	20.	43.	20.
14—Performance or 15—Character of offspring,	50		3.	. . . .	. .	. .	. . .	. .	. .	. .	25.			
Total,	200	108 00	108.25	107.00	109.25	98.00	124.75	100.25	97.00	110 50	147.00	95 50	120.25	96.00

V. H. SEAMAN,
W. W. SHUIT,
GURNEY C. GUE,
Judges.

Instructions about Names, Preparing Pedigrees for Registration, The Standard, etc.

[From Wallace's Monthly, No. 212 Broadway, N. Y.]

Select good, short names, and don't borrow. It is in bad taste to attach "Jr." or "Young" to a name. Owners' names will not be accepted as a prefix or part of a name. Avoid the use of initial letters to names. The recent action on this subject is as follows:

"*Resolved*, That every stallion and colt entire should be registered under a name distinctively his own, and that the name of a distinguished ancestor or sire, or any material part thereof, should not be repeated in any form when naming animals further removed than the immediate progeny of such ancestor or sire."

This action means a great deal; its language is plain, and all we need to say about it is that it will be carried out.

Fill out the blank form carefully and fully as far as you go. Designate sires by their numbers when you know them. Don't omit little things like color, sex, and year of foaling. If you are careless you will have to pay for it.

Observe the heavy letters—A, B, C, etc.—to the left. At A insert the name of the animal to be registered, with all that is suggested in the blank; at B insert the dam, her breeder, her sire, etc., as indicated; at C insert the second dam, her breeder, her sire, etc., and thus continue till you have exhausted all that you know of the pedigree. Guess at nothing.

Don't forget that at the point where you fail to give the breeder and a satisfactory account of any of the dams, the pedigree will there be cut off. Go no further than you can go safely.

There has been no change made in the standard. Don't forget, however, that when a horse becomes standard, the animal or animals upon which that rank is dependent must first be traced and registered, at the expense of the owner.

A. **Name,** . . . . **Color and sex,** . . . . . **Year foaled,** . .
Bred by, ... **P. O. and State,** . . . .
Got by, ... **Son of,** . . . .

. . . .

B. **Name of dam,** . . . . **Bred by,** . . . .
P. O. and State, ...
Got by, ... **Son of,** . . . .
[Let us have no guess-work about names and breeders of dams.]

. . . .

C. **Name of 2d dam,** . . . . **Bred by,** . . . .
P. O. and State, ...
Got by, ... **Son of,** . . . .

. . . .

D. **Name of 3d dam,** . . . . **Bred by,** . . . .
P. O. and State, ...
Got by, ... **Son of,** . . . .

. . . .

E. **Give addresses of all successive owners,** . . . .

. . . .

Present owner and P. O. address, ...

Admission to the Non-Standard Department has been made more stringent. Nothing depending upon trotting-blood will be admitted there except fillies and mares, and they must be by a standard horse, and this horse must first be registered at the owner's expense.

Pacers will be admitted to the Non-Standard Department on the basis of a 2.30 pacing record, and under the same rules and conditions as apply to standard trotters. The admission of non-standard historical pedigrees will be at the option of the compiler.

The Standard.

[Established by the National Association of Trotting-Horse Breeders.]

In order to define what constitutes a trotting-bred horse, and to establish a breed of trotters on a more intelligent basis, the following rules are adopted to control admission to the records of pedigrees. When an animal meets the requirements of admission, and is duly registered, it shall be accepted as a standard trotting-bred animal.

First. Any stallion that has himself a record of two minutes and thirty seconds (2.30) or better, provided any of his get has a record of 2.40 or better, or provided his sire or his dam, his grandsire or his grandam, is already a standard animal.

Second. Any mare or gelding that has a record of 2.30 or better.

Third. Any horse that is the sire of two animals with a record of 2.30 or better.

Fourth. Any horse that is the sire of one animal with a record of 2.30 or better, provided he has either of the following additional qualifications: 1. A record himself of 2.40 or better. 2. Is the sire of two other animals with a record of 2.40 or better. 3. Has a sire or dam, grandsire or grandam, that is already a standard animal.

Fifth. Any mare that has produced an animal with a record of 2.30 or better.

Sixth. The progeny of a standard horse when out of a standard mare.

Seventh. The progeny of a standard horse out of a mare by a standard horse.

Eighth. The progeny of a standard horse when out of a mare whose dam is a standard mare.

Ninth. Any mare that has a record of 2.40 or better, and whose sire or dam, grandsire or grandam, is a standard animal.

Tenth. A record to wagon of 2.35 or better shall be regarded as equal to a 2.30 record.

OFFICE OF WALLACE'S AMERICAN TROTTING REGISTER.

Terms two dollars for each pedigree in the register. After an animal is registered, the pedigree may be inserted in the *Monthly* at one dollar to regular annual subscribers, and two dollars to those not subscribers.

Blank forms will be furnished gratuitously to all applicants, and these blanks must be followed in every particular, or the reason for not doing so must be stated. Where there is negligence or omissions in filling blanks, thereby rendering further correspondence necessary, we will not hestitate to make a charge for that correspondence.

In all cases requiring tedious and laborious investigation, we must be paid for the time consumed, whether the pedigree be accepted or not.

Never name a stallion, or a colt that may be kept as a stallion, till you shall first have examined the new rule on this subject, and the other regulations found on the other side.

One dollar each will be charged for official certificates of registration.

When a member of a family is already registered, always refer to that for the extension of the pedigree.

Charles H. Lafferty, Philadelphia, best filly, two years and under three, "Fannie Messenger," first premium, ...	$30 00
Charles Scattergood, Gentlemen's Driving Park, Philadelphia, second best, "Helen G," second premium, ...	20 00
David C. Louder, Millersville, Pa., best filly, one year, and under two, first premium, ...	20 00
Wm. E. Phillips, Abrams, Pa., second best, "Mame S," second premium, ...	15 00
P. Lafferty, 1923 Christian street, Philadelphia, best stallion, one year and under two, "Silver King," first premium, .	$20 00
John Dougherty, 4300 Lancaster avenue, Philadelphia, second best, "Lafayette," second premium, ...	15 00
Daniel G. Engle, Marietta, Pa., best brood mare with foal at her foot, "Rosa Viley," first premium, ...	60 00
Harry Mann, Washington, Lancaster county, Pa., second best, second premium, ...	40 00
Tobias Barto, Reading, Pa., best brood mare, four years and over, "Katie Middletown," first premium, ...	50 00
E. Lewis Ashbridge, Willistown Inn P. O., Pa., second best, "Belle Matcher," second premium, ... , ...	30 00
C. Frank Barrett, best filly, three years and under four, "Jennie James," first premium, ...	30 00
W. E. Phillips, Abrams, Montgomery county, Pa., second best, "Fairy," second premium, ...	25 00

We, the committee on Class 3, make the foregoing report.

John S. Miller,
Wm. S. Taylor,
J. H. Lewis, Jr.,
Committee.

CLASS 3—CARRIAGE, COACH, AND LIGHT DRAUGHT HORSES, MARES, AND COLTS.

Cleveland Bays, Coachers, Carriage Horses, and animals for the combined purpose of work and road. Stallions five (5) years old and over must be sixteen hands in height and not less than eleven hundred and fifty pounds in weight. No undersized animal can be awarded a premium in this class under any circumstances, neither will overgrowth be considered a qualification of merit.

S. K. Nissley, Florin, Lancaster county, Pa., best stallion, five years and over, "Delgardo," first premium, ...	$75 00
Chas. Scattergood, Gentlemen's Driving Park, Philadelphia, second best, "Scattergood's Almont," second premium, .	50 00
C. Frank Barrett, No. 1400 Frankford avenue, Philadelphia, best stallion, four years and under five, "Elwood Medium, Jr.," first premium, ...	50 00

Charles Dudley, Holmesburg, Pa., second best, "Pride of the Morning," second premium,	$30 00
David C. Souders, Millersville, Pa., best stallion, three years and under four, "Dr. Arward," first premium,	40 00
John A. Wilson, Wilmington, Del., best stallion, two years and under three, "Delaware Wilkes," first premium,	30 00
Adam Marqueen, Glenmore, Pa., second best, "Almont Glenmore," second premium,	20 00

CLASS 4—DRAUGHT HORSES, MARES, AND COLTS.

Percherons, Clydesdales, Flemish, the several families of English draught, and all others recognized as belonging to pure draught breeds.

John A. Wilson, Wilmington, Delaware, best Norman Percheron stallion, five years and over, imported, "Pamphile," first premium,	$75 00
J. L. Kunkle, Irwin, Pa., "Imported Stafford," Clydesdale, second best, second premium,	50 00
F. Y. Clopper, Greensburg, Pa., best Clydesdale stallion, four years and under five, "Mangle," first premium,	50 00
Obadiah Gongware, Greensburg, Pa., second best Clydesdale "Arabi," second premium,	40 00
J. L. Kunkle, Irwin, Pa., best Clydesdale stallion, three years and under four, "Lord Lyon," first premium,	40 00
F. Y. Clopper, Greensburg, second best Clydesdale "Chauncey," second premium,	30 00
J. L. Kunkle, Irwin, Pa., best stallion two years and under three, Clydesdale "Columbus," first premium,	30 00
J. L. Kunkle, second best two years and under three, Clydesdale "Carluke," second premium,	20 00
John B. Kendig, second best one year and under two, Norman Percheron, "Paul, Jr.," second premium,	15 00
J. L. Kunkle, best brood mare, four years and over, Clydesdale "Lillie," first premium,	50 00
J. L. Kunkle, second best brood mare, Clydesdale "Blossom," second premium,	30 00
R. E. Coe, Kirkville, N. Y., best filly, two years and under three, Norman Percheron, "Tauchon," first premium,	30 00
R. E. Coe, second best Norman Percheron "Conebola," second premium,	20 00

Respectfully submitted.

TOBIAS BARTO,
JOHN J. PARKER,
ALEXANDER SCOTT,
Committee.

CLASS 5—DRAUGHT HORSES. (ALL DRAUGHT ANIMALS NOT ADMISSIBLE IN CLASS 4.)

William Shireman, Middletown, Pa., best stallion, five years and over, "Bonnie Robin," first premium,	$75 00
Jeremiah Roth, Allentown, Pa., second best, "Jumbo," second premium,	40 00
John B. Kendig, Willow street, Lancaster, best brood mare, with foal at her foot, "Norman Fan," first premium,	50 00

W. E. Phillips, Abrams, Montgomery county, Pa., second best, "Topsy," second premium,	$25 00
Jeremiah Roth, second best brood mare, four years and over, "Jennie," second premium,	20 00
F. Y. Clopper, Greensburg, Pa., best filly, two years and under three, "Sallie Portzer," first premium,	15 00
John B. Kendig, second best, "Nellie," second premium,	10 00

Respectfully submitted.

Tobias Barto,
John J. Parker,
Alexander Scott,
Committee.

CLASS 6—Harness and Saddle Horses.

Charles Williams, Buckingham, Pa., best pair coach horses, "Bill and Jerry," first premium,	$40 00
Charles Williams, second best, "Dan and Jim," second premium,	25 00
J. L. Kunkle, Irwin, Pa., best gelding for farmers' use, "Black Prince," first premium,	25 00
Jeremiah Roth, Allentown, Pa., second best, "Jerry," second premium,	10 00
H. B. Richards, Easton, Pa., best roadster, "Merritt S.," first premium,	30 00
Daniel G. Engle, Marietta, Pa., second best, "Czar Allen," second premium,	20 00
J. H. Lewis, Jr., Media, Pa., best saddle horse, gaited, "Sprightly," first premium,	30 00
Charles Williams, second best, "Fannie," second premium,	20 00
Jeremiah Roth, Allentown, Pa., second best pony, "Minnie,"	5 00

Respectfully submitted.

C. N. Barnard,
Wm. Shireman,
Committee.

Fair Grounds, *September 15, 1886.*

Your committee on No. 58, roadster class, to whom the objections of award to "Merritt S.," the property of Mr. H. B. Richards, of first premium in said number, was made by C. A. Van Artsdalen, M. D., a competitor and owner of "Ogontl," an entry therein, beg leave to respectfully report that in obedience to your request, in conjunction with Mr. J. H. Lewis, Jr., they have reëxamined said "Merritt S.," and believe that the mark on his knee is temporary, and was caused by accident in shipment, as claimed, and is not the result of any chronic or constitutional ailment. We, therefore, decline to reverse our award.

(Signed)

C. N. Barnard,
Wm. Shireman,
J. H. Lewis, Jr.,
Committee.

CLASS 7—Running.

Wednesday, Sept. 8—½-*Mile Heats, 2 in 3; Weights, 120 pounds.*

M. W. Hayes, West Chester, br. g. "Reformation,"	1	1
John Lynch, Philadelphia, b. g. "J. J. D.,"	2	2

Samuel Berry, Philadelphia, ch. m. "Elk,"	4 3
M. W. Hayes, West Chester, b. g. "Nat Trimble,"	3 4
M. Robinson, Jr., Paoli, ch. g. "Conundrum,"	5 5
S. D. Riddle, Glen Riddle, ch. f. "Witchcraft,"	drawn.

Time, 56¼, 56.

Same Day, Sept. 8—*One Mile and Repeat, Catch Weights.*

J. Lambert, Philadelphia, ch. g. "Armadale,"	1 1
S. D. Riddle, Glen Riddle, ch. g. "Witchcraft,"	2 2
John Lynch, Philadelphia, b. g. "J. J. D."	drawn.
M. W· Hayes, West Chester, br. g. "Vibrator,"	drawn.

Time, 1.51, 1.52.

Same Day, Sept. 8—*Steeple Chase, Two Miles.*

H. A. Dalmas, Glenolden, Pa., ch. m. "Nellie Free,"	1
Wm. Rankin, Glenolden, Pa., g. m. "Nell,"	2

Thursday, Sept. 9—½ *Mile Heats 2 in 3; Weights, 120 pounds.*

M. W. Hays, West Chester, br. g. "Reformation,"	1 1
Samuel Berry, Philadelphia, ch. m. "Elk,"	2 2
W. H. Henderson, Philadelphia, b. g. "Pansy,"	3 dr.
J. J. Lambert, Philadelphia, b. g. "J. J. D."	drawn.
M. W. Hays, West Chester, b. g. "Nat. Trimble,	drawn.
S. D. Riddle, Glen Riddle, ch. m. "Witchcraft,"	drawn.

Time, 55¼, 56.

Same Day, Sept. 9—1¼ *Mile Dash; Weights, 120 pounds.*

Poverty Stables, Media, ch. g. "Chanticleer,"	1
M. Robinson, Jr., Paoli, ch. g. "Conundrum,"	2
L. P. Ferris, Philadelphia, br. g. "Mardi,"	fell.
J. H. Lewis, Jr., Media, b. f. "Nannie Gentry,"	drawn.

Time, 2.31.

Same Day, Sept. 9—¾ *Mile Heats, 2 in 3; Weights, 150 pounds.*

S. D. Riddle, Glen Riddle, ch. m. "Witchcraft,"	2 1 1
John Lambert, Philadelphia, b. g. "J. J. D.,"	1 2 2
M. W. Hays, West Chester, b. g. "Nat. Trimble,"	3 3 r. o.
W. H. Henderson, Philadelphia, b. g. "Pansy,"	drawn.

Time, 1.24, 1.24, 1.26¼.

Same Day, Sept. 9—*1 Mile Dash; Weight, 150 pounds.*

Poverty Stables, Media, ch. g. "Chanticleer,"	1
H. A. Dalmas, Glenolden, ch. m. "Nelly Free,"	2
J. H. Lewis, Jr, Media, b. g. "Sprightly,"	3
J. H. Lewis, Jr., Media, b. f. "Nannie Gentry,"	drawn.

No time.

Friday, Sept. 10—½ *Mile Heats, 2 in 3; Weights, 120 pounds.*

M. W. Hays, West Chester, br. g. "Reformation,"	2 1 1
M. W. Hays, West Chester, b. g. "Nat. Trimble,"	1 2 2
J. Lambert, Philadelphia, b. g. "J. J. D.,"	drawn.
Samuel Berry, Philadelphia, ch. m. "Elk,"	drawn.
William Rankin, Glenolden, g. m. "Frank Folsom,"	drawn.

Time, 57, 55¼, 56.

SAME DAY, Sept. 10—*1¼ Mile Dash; Weights, 150 pounds.*

H. A. Dalmas, Glenolden, ch. m. “Nelly Free,”	1
Poverty Stables, Media, ch. g. “Chanticleer,”	2
L. A. Arnold, Philadelphia, ch. g. “Ben Pryor,”	drawn.

Time, 2.47½.

SAME DAY, Sept. 10—*¾ Mile Heats, 2 in 3; Weights, 120 pounds.*

S. D. Riddle, Glen Riddle, ch. m. “Witchcraft,”	1 1
J. H. Lewis, Jr., Media, b. m. “Saphrano,”	2 fell.
L. A. Arnold, Philadelphia, b. g. “Ben Wooley,”	drawn.
W. H. Henderson, Philadelphia, b. g. “Pansy,”	drawn.
M. W. Hays, West Chester, br. g. “Reformation,”	drawn.

Time, 1.24, 1.30.

SATURDAY, Sept. 11—*½ Mile Heats, 2 in 3; Weights, 120 pounds.*

M. W. Hays, West Chester, br. g. “Reformation,”	1 1
Samuel Berry, Philadelphia, ch. m. “Elk,”	2 2
Wm. Rankin, Glenolden, g. m. “Frank Folsom,”	drawn.
S. D. Riddle, Glen Riddle, ch. m. “Witchcraft,”	drawn.
J. H. Lewis, Jr., Media, b. f. “Nannie Gentry,”	drawn.
J. H. Lewis, Jr., Media, b. f. “Saphrano,”	drawn.

Time, 57½, 57.

SAME DAY, Sept. 11— *Dash, 1 mile; Weights, 150 pounds.*

S. D. Riddle, Glen Riddle, ch. m. “Witchcraft,”	1
Povery Stables, Media, ch. m. “Chanticleer,”	2
H. A. Dalmas, Glenolden, ch. m. “Nelly Free,”	3
W. Rankin, Glenolden, gr. m. “Frank Folsom,”	drawn.
J. H. Lewis, Jr., Media, br. g. “Sprightly,”	drawn.
W. H. Henderson, Philadelphia, b. g. “Pansy,”	drawn.

Time, 1.50.

SAME DAY, Sept. 11—¾-*Mile Heats, 2 in 3; Weights, 120 pounds.*

Poverty Stables, Media, ch. g. “Chanticleer,”	1 1
J. H. Lewis, Jr., Media, b. f. “Nannie Gentry,”	2 2
J. H. Lewis, Jr., Media, b. f. “Saphrano,”	drawn.
H. A. Dalmas, Glenolden, ch. m. “Nelly Free,”	drawn.

Time, 55¼, 57.

TUESDAY, Sept. 14—½-*Mile Heats, 2 in 3; Weights, 150 pounds.*

S. D. Riddle, Glen Riddle, ch. m. “Witchcraft,”	1 1
Miss Nellie Burke, Nebraska, br. s. “Marvie B.,”	2 2
J. H. Henderson, Philadelphia, br. g. “Reformation,”	3 3
J. H. Lewis, Jr., Media, b. f. “Nannie Gentry,”	drawn.

Time, 54¾, 55.

SAME DAY, Sept. 14—¾-*Mile Heats, 2 in 3; weights, 120 pounds.*

Miss Nellie Burke, Nebraska, ch. g. “Rinick,”	1 1
J. H. Lewis, Jr., Media, b. f. “Nannie Gentry,”	2 2
J. H. Henderson, Philadelphia, br. g. “Reformation,”	3 3
S. D. Riddle, Glen Riddle, ch. m. “Witchcraft,”	drawn.
Samuel Berry, Philadelphia, ch. m. “Elk,”	drawn.
W. H. Henderson, Philadelphia, b. g. “Pansy,”	drawn.

Time, 1.24, 1.22.

Same Day, Sept. 14—*Foot-race, Grooms, 200 yards.*

Fleming Jeffries,	1
W. A. Andrews,	2
A. Wilson,	3

Wednesday, Sept. 15—½-*Mile Heats, 2 in 3; Weights, 120 pounds.*

Miss Nellie Burke, Nebraska, ch. g. "Renick,"	1 1
Samuel Berry, Philadelphia, ch. m. "Elk,"	2 2
S. D. Riddle, Glen Riddle, ch. m. "Witchcraft,"	drawn.
J. H. Henderson, Philadelphia, br. g. "Reformation,"	drawn.

Time, 56½, 57.

Same Day—*Foot-race, Jockey-riders, 200 yards.*

J. Howard Lewis, Jr.,	1
Charles Charleston,	2
James Weir,	3

Same Day, Sept. 15—1¼-*Mile Dash; Weights, 150 pounds.*

Miss Nellie Burke, Nebraska, br. s. "Marvie B.,"	1
S. D. Riddle, Glen Riddle, ch. m. "Witchcraft,"	2
W. H. Henderson, Philadelphia, br. g. "Reformation,"	3
J. H. Lewis, Jr., Media, b. f. "Nannie Gentry,"	drawn.
Miss Nellie Burke, Nebraska, b. g. "Frozen Bill,"	drawn.

Time, 1.22.

Thursday, Sept. 16—½-*Mile Heats, 2 in 3; Weights, 120 pounds.*

Miss Nellie Burke, Nebraska, b. g. "Lewis,"	1 1
Samuel Berry, Philadelphia, ch. m. "Elk,"	3 2
W. H. Henderson, Philadelphia, br. g. "Reformation,"	4 3
John Lambert, Philadelphia, b. g. "J. J. D.,"	2 drawn
S. D. Riddle, Glen Riddle, ch. m. "Witchcraft,"	drawn.

Time, 1.01½; 1.02.

Friday, Sept. 17—1¼-*Mile Dash; Weights, 150 pounds.*

Miss Nellie Burke, Nebraska, br. s. "Marvie B.,"	1
J. H. Lewis, Jr., Media, b. f. "Nannie Gentry,"	2
J. H. Lewis, Jr., Media, b. g. "Sprightly,"	drawn.

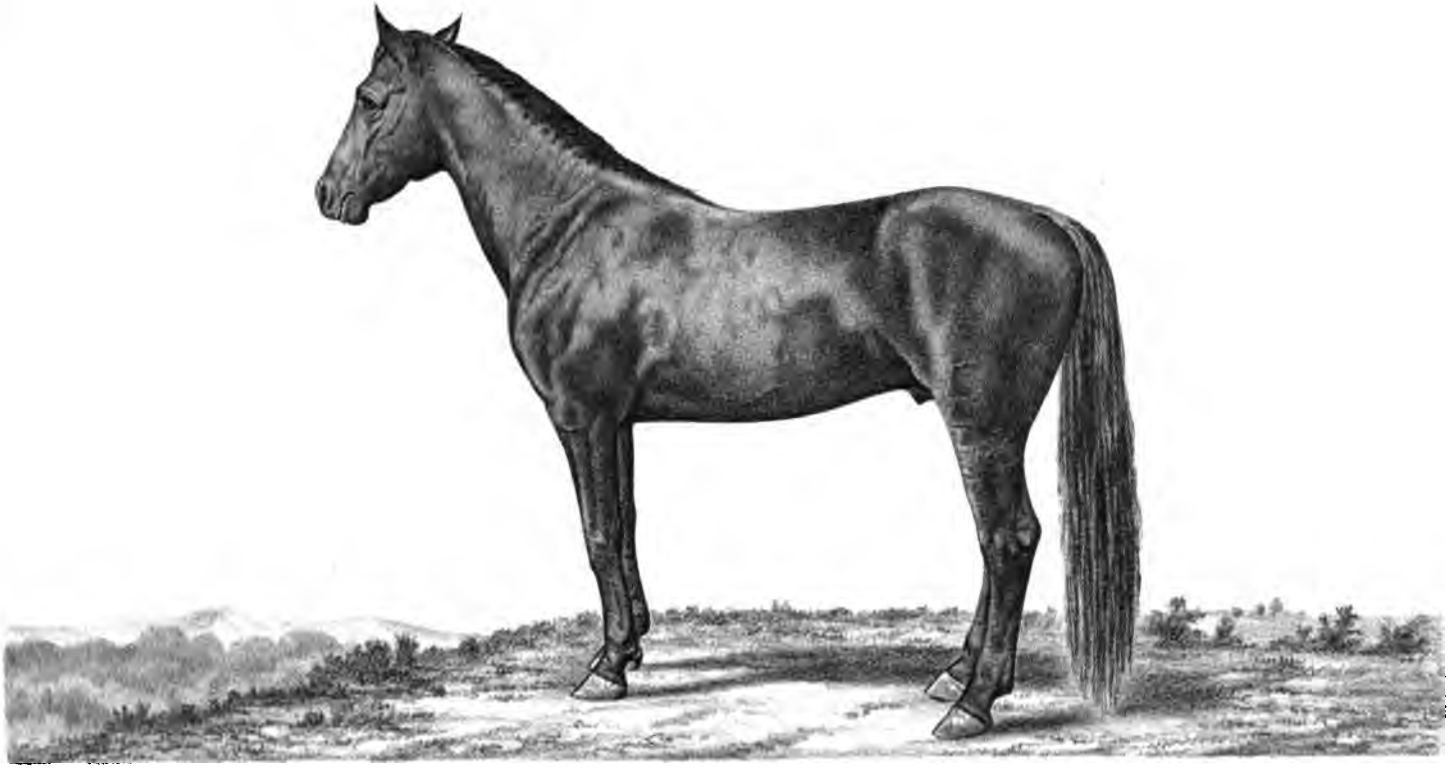
Time, 1.23½.

Same Day, Sept. 17—½-*Mile Heats, 2 in 3; Weights, 120 pounds.*

Miss Nellie Burke, Nebraska, ch. g. "Renick,"	1 1
S. D. Riddle, Glenolden, Pa., ch. m. "Witchcraft,"	2 2
W. H. Henderson, Philadelphia, br. g. "Reformation,"	3 3
Miss Nellie Burke, Nebraska, b. g. "Lewis,"	drawn.
Samuel Berry, Philadelphia, ch. m. "Elk,"	distanced.

Miss Nellie Burke gave exhibitions of riding, with Miss Mabel Floss, Ned Moore, and others, daily from September 14 to 18, inclusive, and in addition, chariot races, exhibition of riderless horses, contests between horses and greyhounds, all of which attracted great attention.

Exhibitions of speed and fancy riding were also given by the wheelmen of Philadelphia on Saturday.



INTRIGUE, 6 YEARS,

Winner First Prize, Philadelphia, 1886. Owned by Konover & Co., Trenton, N. J.

GROUP II—Cattle.

Must be registered in Allen's, Alexander's, the English Herd Book, or the Ohio Short Horn Record.

CLASS 8—SHORT HORNS.

R. S. Jameson, Greensburg, Pa., best herd,	$100 00
F. Y. Clopper, Greensburg, Pa., second best,	50 00
F. Y. Clopper, best bull, three years and over, "Duke of Locust Grove," first premium,	75 00
R. S. Jameson, best bull between two and three years, "3rd Duke of Hempfield," two years, first premium,	60 00
R. S. Jameson, second best, "Constantine of Locust Grove, 2d," second premium,	30 00
R. S. Jameson, best bull between one and two years, "Constantine 3d of Locust Grove," first premium,	40 00
F. Y. Clopper, second best, "17th Duke of Skara Glen," second premium,	25 00
F. Y. Clopper, best cow, four years and over, "Maid of Skara Glen, 14th," first premium,	60 00
R. S. Jameson, second best, "3d Duchess of Locust Grove," second premium,	40 00
R. S. Jameson, best cow, three years and under four, "14th Duchess of Locust Grove," first premium,	$40 00
R. S. Jameson, second best heifer, two years and under three, "4th Elvina of Locust Grove," second premium,	15 00
F. Y. Clopper, best heifer, one year and under two, "Maggie Muscatoon, 5th," first premium,	20 00
F. Y. Clopper, second best, "Maid of Skara Glen 27th," second premium,	15 00

In awarding the above premiums, your committee found the competition very close, and the placing of awards consequently very difficult. We doubt whether this class has ever been better represented at any of the previous exhibitions of the society.

For the committee.

J. C. THORNTON,
Chairman.

CLASS 9—DEVONS.

Must be either imported or descended on both sides from imported animals only.

Rumsey Brothers, Westfield, N. Y., best herd,	$100 00
W. H. Jones & Son, South Montrose, Pa., second best,	50 00
Rumsey Brothers, best bull three years and over, "Marquis 2d," first premium,	75 00
W. H. Jones & Son, second best, "Prince Taurus," second premium,	40 00
W. H. Jones & Son, best bull, two years and under three, "Retainer," first premium,	50 00
W. H. Jones & Son, second best, "Lord Lyndhurst," second premium,	25 00
James Hilton, New Scotland, Albany county, N. Y., best bull, one year and under two, "Chancellor," first premium,	30 00
J. B. Longenecker, Union Deposit, Pa., second best, "Element," second premium,	20 00

Rumsey Brothers, best cow, four years and over, "Betsy," first premium,	$50 00
Banker Brothers, Upsonville, Pa., second best "Bright Promise," second premium,	25 00
James Hilton, best cow, three years and under four, "Maid of Utica," first premium,	25 00
Rumsey Brothers, second best, "Snowdrop," second premium,	15 00
W. H. Jones & Son, best heifer, two years and under three, "Blanchella," first premium,	25 00
J. B. Longenecker, second best, "Soothsayer," second premium,	15 00
James Hilton, best heifer, one year and under two, "Belle of Scotland," first premium,	20 00
Rumsey Brothers, second best, "Solo," second premium,	10 00

The undersigned beg leave to report that they found the competition very close in this class. All the animals entered were creditable alike to owners and the exhibition.

J. W. NICHOLSON,
MARK HUGHES,
JOHN A. WALLACE,
Committee.

CLASS 10—HOLSTEINS.

Must be either imported or descended on both sides from imported animals only.

Roberts, Durnall & Hicks, West Chester, Pennsylvania, best herd,	$100 00
W. M. Singerly, Gwynedd, Pennsylvania, second best herd,	50 00
Lycoming Breeders' Association, Williamsport, best bull, three years and over, "Mooie Sjoerd," first premium,	75 00
Lackawanna Breeders' Association, Waverly, Pennsylvania, second best, second premium,	40 00
Roberts, Durnall & Hicks, best bull between two and three years, "Pel 7th," first premium,	50 00
Lackawanna Breeders' Association, second best, "Dudey," second premium,	25 00
Lackawanna Breeders' Association, best bull between one and two years, "Cresson," first premium,	30 00
Roberts, Durnall & Hicks, second best, "Detlaus," 1488, second premium,	20 00
Roberts, Durnall & Hicks, best cow, four years and over, "Binena," first premium,	50 00
Roberts, Durnall & Hicks, second best, "Vojeltje," second premium,	25 00
W. M. Singerly, best cow, three years and under four, "Gomora," first premium,	35 00
Lackawanna Breeders' Association, second best, "Pride of Lackawanna," second premium,	20 00
W. M. Singerly, best heifer between two and three years, "Bornia," first premium,	25 00
Lackawanna Breeders' Association, second best, "Teakje 3d," second premium,	15 00
Lackawanna Breeders' Association, best heifer between one and two years, "Celinda," first premium,	20 00

W. M. Singerly, second best, "Englewood S.," second premium,	$10 00

We, the undersigned, your committee, have examined the Holsteins, (Class 10,) and made the awards to the best of our judgment. The majority were excellent—some very superior—the competition being so close in some instances that we found considerable difficulty in arriving at conclusions. We consider the display as very creditable both to the society and the exhibitors.

Thomas Sharpless,
Joel B. Pusey,
William Cox,
Committee.

CLASS 11—AYRSHIRES.

Must be either imported or descended on both sides from imported animals only.

William Fairweather, McLane, Erie county, Pa., best herd,	$100 00
J. O. Magie & Son, Elizabeth, N. J., second best,	50 00
William Fairweather, best bull three years and over, "Dunkeld," first premium,	75 00
William Lindsay, Elizabeth, N. J., second best, "McDuff of Orwell," first premium,	40 00
J. O. Magie & Son, best bull two years and under three, "James G. Blaine," first premium,	50 00
William Fairweather, second best, "Lundie," second premium,	25 00
J. O. Magie & Son, best bull one year and under two, first premium,	30 00
William Lindsay, second best, "Billy Button," second premium,	20 00
J. O. Magie & Son, best cow four years and over, "Lady Clarinda 2d," first premium,	50 00
J. F. Butterfield, Montrose, Pa., second best, "Azubah," second premium,	25 00
William Lindsay, best cow three years and under four, "Thistle," first premium,	35 00
J. O. Magie & Son, second best, "Dolly Dot," second premium,	20 00
William Lindsay, best heifer two years and under three, "Queen's Pet," first premium,	25 00
J. O. Magie & Son, second best, "Brown Lady 6th," second premium,	15 00
J. O. Magie & Son, best heifer between one and two years, "Dolly Spot of Union," first premium,	20 00
William Lindsay, "Vinnie's Last," second best, second premium,	10 00

Your committee beg leave to report that in the examination of this class, your society imposed an onerous duty, as the competition was so close on many exceedingly fine animals. We deem them highly creditable to the exhibitors, and commend the society for offering such encouragement to the breeders as brought such a handsome display before the public.

J. W. Nicholson,
William H. Vogdes,
John A. Wallace,
Committee.

CLASS 12—JERSEYS.

Must be registered in the herd book of the American Jersey Cattle Club, or in that of the Royal Agriculture Society of Jersey.

H. C. highly commended—

Jeremiah Roth, Allentown, Pa., best herd,	$100 00
S. Kirkpatrick, Mount Pleasant, East Park Dairy, Philadelphia, second best,	50 00
E. C. Knight, Philadelphia,	H. C.
S. Kirkpatrick, best bull three years and over, “Uproar 3d,” first premium,	75 00
E. C. Knight, second best, “King of the North,” second premium,	40 00
James Watts Mercur, Wallingford, Pa., third premium, “Morgante,” H. C.	
George Fox, Torresdale, Pa., best bull two years and over, “Bessus,” first premium,	50 00
Jeremiah Roth, “Albert Rex” 2d, third premiums,	H. C.
David C. Souder, Millersville, Lancaster county, Pa., second best, “Blason,” second premium,	25 00
J. E. Gillingham, Villa Nova, Pa., best bull one year and under two, “Rioter of Clairmont,” first premium,	30 00
James Watts Mercur, second best bull one year and under two, “Imp. Comas Boy,” second premium,	20 00
S. Kirkpatrick, third best bull, two years and over, “Lorne Pogis 2d,” third premium,	H. C.
Jeremiah Roth, best cow, four years and over, “Royal Beauty,” first premium,	50 00
James Watts Mercur, second best imported, “Roneta,” second premium,	25 00
Jeremiah Roth, third best, “Phrymore,” third premium,	H. C.
E. C. Knight, best cow, three years and under four, “Sarona’s Lassie,” first premium,	35 00
James Watts Mercer, second best, “Brincaneta,” second premium,	20 00
E. C. Knight, third best, “Lady Pompey, ”third premium,	H. C.
Geo. Fox, best heifer, two years and under three, “Rita of Andalusia,” first premium,	25 00
E. C. Knight, second best, “Young Agnes,” second premium,	15 00
E. C. Knight, third best, “Indian Queen,” third premium,	H. C.
C. L. Kilburn, Germantown, Pa., best heifer, one year and under two, “Linie Veal,” first premium,	20 00
Charles Richardson, Shoemakerville, Pa., second best, “Brown Kitty,” second premium,	10 00
E. C. Knight, third best, “Lady Knight,” third premium,	H. C.
J. E. Gillingham, best display of bulls and heifers, not less than six in number, bred by exhibitor, first premium,	20 00
E. C. Knight, second best display,	10 00

The fine display of Jersey cattle merits notice, especially in some of the sub-divisions, where the competition was so strong that your committee had much difficulty in placing the awards.

WM. R. WILLIAMS, Falls of Schuylkill,
J. I. BISHOP, Columbus, N. J.,
WM. S. TAYLOR, Burlington, N. J.,
Committee.

CLASS 13—GUERNSEYS.

Must be registered in the American Guernsey Cattle Club Register.

E. Michener, Carversville, Pa., best bull, three years and over, "Clingstone," first premium,	$75 00
Wm. Lindsay, Elizabeth, N. J., second best, "Oscar," second premium,	40 00
C. M. Walter, West Chester, Pa., best bull, two years and under three, "Oak Bud," first premium,	50 00
W. Lindsay, second best, "Hard Times," second premium,	25 00
E. Michener, best bull, one year and under two,	30 00
W. Lindsay, best cow, four years and over, "Bernice," first premium,	50 00
E. Michener, second best, "Hattie Woodward," second premium,	25 00
E. Michener, best cow, three years and under four, "Early Rose," first premium,	35 00
W. Lindsay, second best, "Rose Fillpail," second premium,	20 00
E. Michener, best heifer, two years and under three,	55 00
E. Michener, best heifer, one year and under two, "Rose K's Last," first premium,	20 00
E. Michener, bull, "Clingstone," and six of his get, bred and owned by exhibitor, first premium,	20 00

Your committee beg leave to report that they regret that there was not greater competition in this class, the number being very small for a representative dairy breed.

J. W. Nicholson,
Mark Hughes,
Jhon A. Wallace,
Committee.

CLASS 14.—HEREFORDS.

No awards of other than the herd prizes will be made in this class, unless at least two herds belonging to separate and distinct owners are entered in competition.

H. O. McKnight & Son, McConnell's Mills, Washington county, Pennsylvania, best herd,	$100 00
G. W. Millikin, Youngstown, Ohio, second best,	50 00
H. O. McKnight & Son, best bull, three years and over, "Edwards," first premium,	75 00
G. W. Millikin, Youngstown, Ohio, second best, "Leotard," second premium,	40 00
G. W. Millikin, best bull, two years and under three, "Prince of Oakland," first premium,	50 00
H. O. McKnight & Son, best bull, one year and under two, "John Sherman," first premium,	30 00
G. W. Millikin, second best, "Butler," second premium,	20 00
G. W. Millikin, best cow, four years and over, "Favorite," first premium,	50 00
H. O. McKnight & Son, second best, "Queen of the East," second premium,	25 00
H. O. McKnight & Son, best cow three years and under four, "Mattie," first premium,	35 00
G. W. Millikin, second best, "Esther 2d," second premium,	20 00

G. W. Millikin, best heifer, two years and under three, "Mabel" first premium,	$25 00
H. O. McKnight & Son, second best, "Florence," second premium,	15 00
G. W. Millikin, best heifer, one year and under two, "Reha," first premium,	20 00
H. O. McKnight & Son, second best, "Maggie," second premium,	10 00

Your committee find this class well represented, all the entries in fine condition, and well cared for.

J. C. THORNTON,
Chairman.

CLASS 15—OTHER RECOGNIZED BREEDS.

140. Herd of thoroughbred cattle, composed of one bull and six cows or heifers over one year old, of any recognized breed other than aforementioned, owned by exhibitor.

H. B. Richards, Easton, Pa., one Dutch belted herd, nine in number.

We, the undersigned committee, have examined the herd of Dutch belted cattle mentioned above, there being but one offered, and therefore no competition, but we deem them well worthy of a first premium and a commendable exhibit, in particular the cow "Lady Aldine," and her calf, dropped October 20, 1885. . . . . $100 00

W. H. VOGDES,
J. W. NICHOLSON,
JOHN A. WALLACE,
Committee.

GROUP III—Sheep.

The regulations of the international exhibition of sheep, held at Philadelphia, September, 1880, to govern exhibits in this group.

REGULATIONS OF THE INTERNATIONAL EXHIBITION OF SHEEP, WOOL AND WOOL PRODUCTS.

All sheep entered for competition must be entered in the name of the *bona fide* owner, or owners, or firm, or authorized agent, giving the names of the breed and breeder as well as the owner's residence.

A certificate of authentic pedigree must be filed with the secretary, setting forth that the sheep entered for competition are regularly recorded in a sheep-breeder's register, recognized as such in one or more of the States, or by a foreign association of sheep-breeders, or that they are qualified for entry therein, by descent and beyond dispute, where such registry exists. If registered, a copy of said certificate must be filed with the secretary for the use of the jury of awards. If unregistered, satisfactory proof of their eligibility to registration must be furnished at the time of entry.

All sheep entered as Merino, middle wool, or long wool, and intended for competition in their respective divisions, are not to be overfed, or, in other words, overfat, but must be in good breeding condition. As the great object of the exhibition is to encourage breeders, overfat sheep, except as hereinafter provided, other than lambs, will be excluded.

Merinos entered for competition must be shorn of uniform length over the entire surface, leaving the stubble not longer than three eighths of an inch when shorn, exhibitor to state the time of last shearing. Any subsequent clipping into shape, smoothing the surface, or adding any foreign substance or coloring to the surface, shall disqualify from competition. An exhibitor adjudged to be practicing fraud, whether by violating this rule, or by any other false representation of his exhibit, shall forfeit all his rights and privileges as an exhibitor.

All exhibitors of thoroughbred sheep of any of the three divisions may have the privilege of submitting to the juries of award in such class the scale of points used in entering the animals for registration, where such registration is provided and recognized. When two or more scales of points are submitted, the jury of awards shall have the power to select values from those scales, for use in determining the award. Sheep unregistered, but eligible to registration, unable to scale the requisite points, are declared ineligible to compete for prizes, but if exhibited in pens or flocks, they may contribute to make up the number required; but no prize can be awarded unless such pen or flock, on the average, is the highest of those in competition above the minimum required in any recognized register. Sheep in pens or otherwise, unable to scale the above number of points, can receive only the third or lowest premiums of award. A pen of sheep shall be understood to include three or more in number.

In the English breeds, where no recognized registry exists, the members of the jury of awards shall be governed by such scale of points and such certificates of pedigree and pure breeding as to them shall seem best, such certificates to be filed with the secretary as shall establish that the animals have been imported or descended directly from one or more importations from Great Britain.

CLASS 17—MERINOS AND DELAINES.

Merino sweepstakes.—Pen to consist of two rams of any age, three ewes two years and over, three ewes between one and two years, and three ewe lambs and two ram lambs.

James Glass, Burgettstown, Washington county, Pa., sweepstakes,	$30 00
James Glass, best ram, three years and over, "Wedgewood," first premium,	25 00
S. A. McCalmont, Hickory, Washington county, Pa., second best, "Rip Van Winkle," first premium,	15 00
James Glass, best ram, two years and under three, first premium,	15 00
J. G. Paxton & Sons, Houstonville, Washington county, Pa., second best, second premium,	10 00
S. A. McCalmont, best ram, one year and under two, No. 55, first premium,	15 00
J. G. Paxton & Sons, second best, second premium,	10 00
Premiums for best ram lamb divided between James Glass, S. A. McCalmont, and J. G. Paxton & Sons,	$5 each.
James Glass, best pen, three ewes, over three years, first premium,	20 00
S. A. McCalmont, second best, second premium,	15 00
J. G. Paxton & Sons, best pen, three ewes, two years and under three, first premium,	20 00
S. A. McCalmont, second best, second premium,	15 00
James Glass, best pen, three ewes, one year and under two, first premium,	15 00
J. G. Paxton & Sons, second best, second premium,	10 00

James Glass, best pen, three ewe lambs, first premium,	$10 00
J. G. Paxton & Sons, second best, second premium,	5 00

We respectfully report that the sheep we have examined are very fine. They do credit to the breeder as well as add to the display of fine stock on exhibition.

John McDowell,
Geo. Rhey,
Committee.

CLASS 18—Middle Wooled Southdowns.

Sweepstakes.

Pen to consist of two rams of any age, three ewes two years and over, three ewes between one and two years, and three ewe lambs and two ram lambs.

Jesse K. Cope, West Chester, Pennsylvania, sweepstakes,	$30 00
Jesse K. Cope, best ram, two years and over, first premium,	25 00
Jesse K. Cope, second best, second premium,	15 00
Jesse K. Cope, best ram, one year and under two, first premium,	15 00
C. M. Walter, West Chester, Pennsylvania, second best, second premium,	10 00
C. M. Walter, best ram lamb, first premium,	10 00
Jesse K. Cope, second best, second premium,	5 00
Jesse K. Cope, best pen three ewes, two years and over, first premium,	20 00
J. G. Paxton & Son, Houstonville, Pennsylvania, second best, second premium,	15 00
Jesse K. Cope, best pen three ewes, one year and under two, first premium,	15 00

Other Middle Wooled, including Oxford, Hampshire, and Shropshire Downs.

Lackawanna Breeders' Association, Waverly, Pennsylvania, best ram, two years and over, "Lackawanna," (Shropshire,) first premium,	$25 00
C. M. Walter, second best, (Hampshire,) second premium,	15 00
Lackawanna Breeders' Association, best ram, one year and under two, "Tommy G.," (Shropshire,) first premium,	15 00
C. M. Walter, second best, (Hampshire,) second premium,	10 00
C. M. Walter, best ram lamb, (Shropshire,) first premium,	15 00
Lackawanna Breeders' Association, second best, (Shropshire,) second premium,	10 00
Lackawanna Breeders' Association, best pen three ewes, two years and over, (Shropshire,) first premium,	20 00
C. M. Walter, second best, (Shropshire,) second premium,	15 00
C. M. Walter, best pen three ewes, one year and under two, (Hampshire,) first premium,	20 00
Lackawanna Breeders' Association, second best, second premium,	15 00
Lackawanna Breeders' Association, best pen three ewe lambs, (Shropshire,) first premium,	15 00
C. M. Walter, second best, (Shropshire,) second premium,	10 00

The display in this class we pronounce very fine, indeed, and the competition in many cases was very close.

J. C. THORNTON,
J. C. ROBERTS.
Committee.

CLASS 19—LONG WOOLS, LINCOLNS, COTSWOLDS, LEICESTERS.

Sweepstakes.

Pen to consist of two rams of any age, three ewes two years and over, three ewes between one and two years, and three ewe lambs and two ram lambs.

C. M. Walter, West Chester, Pennsylvania, sweepstakes, (Lincolns,)	$30 00
C. M. Walter, best ram, two years and over, "General Grant," (Lincoln,) first premium,	25 00
C. M. Walter, second best ram, one year and under two, "Shamrock," (Lincoln,) second premium,	10 00
C. M. Walter, best ram lamb, (Lincoln,) first premium,	15 00
C. M. Walter, second best, (Lincoln,) second premium,	10 00
C. M. Walter, best pen three ewes, two years and over, (Lincoln,) first premium,	20 00
C. M. Walter, second best, (Lincoln,) second premium,	15 00
C. M. Walter, best pen three ewes, one year and under two, (Lincoln,) first premium,	20 00
C. M. Walter, second best, (Lincoln,) second premium,	15 00
C. M. Walter, best ewe lamb, (Lincoln,) first premium,	15 00
C. M. Walter, second best, (Lincoln,) second premium,	10 00

The exhibit in this class was small and without competition. The specimens, however, were very fine.

J. C. THORNTON,
J. C. ROBERTS,
Committee.

CLASS 20—FAT SHEEP.

J. G. Paxton & Sons, Houstonville, Washington county, Pa., best five fat Merinos,	$20 00
C. M. Walter, West Chester. Pa., best five fat Long Wools,	20 00

Your committee found no competition in this class.

J. C. THORNTON,
J. C. ROBERTS,
Committee.

CLASS 21—CHESTERS.

C. M. Walter, West Chester, Pa., best boar, two years and over, first premium,	$25 00
C. M. Walter, second best, second premium,	10 00
C. M. Walter, best boar, over one year and under two, first premium,	20 00
C. H. Warrington, West Chester, Pa., second best, second premium,	10 00
E. B. Ashbridge, Willistown Inn P. O., Chester county, Pa., best boar, under one year, first premium,	15 00
E. B. Ashbridge, second best, second premium,	10 00

C. M. Walter, best brood sow, over two years, first premium,	20 00
C. M. Walter, second best, second premium, ...	15 00
C. M. Walter, best sow, over one year, first premium, . . .	15 00
C. M. Walter, second best sow, over one year, second premium, ...	10 00
C. M. Walter, best sow, under one year, first premium, . .	10 00
C. H. Warrington, second best, second premium, ...	5 00
C. M. Walter, best pen five sows, over six months, first premium, ...	20 00
C. M. Walter, best pen five sows under six months, first premium, ...	15 00
E. B. Ashbridge, second best, second premium, ...	10 00

(Signed) E. J. DURNALL,
JAMES C. ROBERTS,
R. E. COE,
Committee.

CLASS 22—BERKSHIRES.

C. M. Walter, West Chester, Pa., best boar, over two years, first premium, ...	$25 00
C. M. Walter, best sow, over one year, "Romeo," first premium, ...	20 00
C. M. Walter, best boar, under one year, "Grant," first premium, ...	15 00
C. M. Walter, second best, "Jim Crow," second premium, .	10 00
C. H. Warrington, West Chester, Pa., best brood sow over two years, first premium, ...	20 00
C. M. Walter, second best, "Belladonna," second premium,	15 00
C. M. Walter, brood sow, over two years, "Beauty of Glendale,"	Worthy.
C. M. Walter, best brood sow, over one year and under two, "Polly Perkins," first premium, ...	15 00
C. H. Warrington, second best, ...	10 00
C. M. Walter, second best sow, under one year, "Dinah," second premium, ...	5 00
C. M. Walter, best pen five sows, under six months, first premium, ...	15 00
C. H. Warrington, second best, second premium, ...	10 00

CLASS 23—POLAND CHINAS.

Edward Hicks, Goshenville, Chester county, best boar, over two years, first premium, ...	$25 00
C. H. Warrington, West Chester, Pa., second best, ...	15 00
J. G. Paxton & Sons, Houstonville, Washington county, Pa.,	Worthy.
J. G. Paxton & Son, best boar, one year and under two, first premium, ...	20 00
Pressley Leech, Burgettstown, Washington county, Pa., second best, second premium, ...	15 00
Pressley Leech, best boar, under one year, first premium, .	15 00
C. H. Warrington, second best, second premium, ...	10 00
C. H. Warrington, best brood sow, over two years, first premium, ...	20 00
S. A. McCalmont, Hickory, Washington county, Pa., second best, second premium, ...	15 00

Pressley Leech, best sow, under one year, first premium,	10 00
J. G. Paxton & Sons, second best, second premium,	5 00
S. A. McCalmont, best pen five sows, under six months, first premium,	15 00
C. H. Warrington, second best, second premium,	10 00

CLASS 24—JERSEY REDS.

William Shireman, Middletown, Pa., second best boar over two years, second premium,	$15 00
Clark Pettit, Salem, N. J., best boar over one year, first premium,	20 00
William Shireman, second best,	15 00
William Shireman, second best boar under one year, second premium,	10 00
Clark Pettit, best brood sow over two years, first premium,	20 00
William Shireman, second best,	15 00
Clark Pettit, best sow over one year and under two, first premium,	15 00
Clark Pettit, best sow under one year, first premium,	10 00
Clark Pettit, second best, second premium,	5 00
William Shireman, best pen, five sows over six months, first premium,	20 00
Clark Pettit, best pen, five sows under six months, first premium,	15 00

William Shireman, second best, second premium.

The exhibition of Berkshire and Poland China pigs was very creditable, many of the animals being up to the standard and requiring much care in judging. I have endeavored to give an impartial judgment according to quality.

WM. B. HARVEY, West Grove, Pa.,
Judge on Berkshire, Poland China, and Jersey Red Pigs.

CLASS 25—YORKSHIRES

J. G. Paxton & Sons, Houstonville, Washington county, Pa., best boar over two years, first premium,	$25 00
J. G. Paxton & Sons, best boar over one year, first premium,	20 00
J. G. Paxton & Sons, second best, second premium,	15 00
J. G. Paxton & Sons, best boar under one year, first premium,	15 00
J. G. Paxton & Sons, best brood sow over two years, first premium,	20 00
J. G. Paxton & Sons, second best,	15 00
J. G. Paxton & Sons, best sow over one year,	15 00
J. G. Paxton & Sons, best sow under one year,	10 00

We, the undersigned committee appointed to pass judgment upon the exhibit of Yorkshire swine, submit the following report: That we found but one competitor, but in all the classes but one we found meritorious animals; in this exceptional class we made no award.

J. C. ROBERTS,
E. J. DURNALL.

CLASS 28—CHESHIRES.

Freeman & Button, Cotton's, N. Y., best boar over two years, "Duke of Salmon," first premium,	$25 00
R. E. Coe, Kirkville, N. Y., second best, "Our Choice," second premium,	15 00
Freeman & Button, best boar over one year, first premium,	15 00
J. Howard Mendenhall, Howellville, Pa., second best, second premium,	10 00
R. E. Coe, best boar under one year, first premium,	15 00
J. H. Mendenhall, second best, second premium,	10 00
Freeman & Button, best breed sow over two years, "Juliet," first premium,	20 00
R. E. Coe, second best, second premium,	10 00
J. H. Mendenhall, best sow over one year, first premium,	15 00
R. E. Coe, second best, second premium,	10 00
R. E. Coe, best sow under one year,	10 00
J. H. Mendenhall, second best,	5 00
Freeman & Button, best pen five sows over six months, first premium,	20 00
R. E. Coe, second premium,	15 00
Freeman & Button, best pen five sows over six months, first premium,	15 00
R. E. Coe, second best, second premium,	10 00

We, the undersigned committee, appointed to judge the exhibit of Cheshire swine, beg leave to report that we found in all tue sub-division entries very worthy competitors.

JAMES C. ROBERTS,
E. J. DURNALL.

GROUP V—Poultry and Fur-Bearing Pets.

CLASS 29—GALLINACEOUS.

Buff Cochins.

H. B. & A. F. Bancroft, Frankford, Pa., breeding pen, 1st,	$2 00
do. do. do. do. 2d,	1 50
do. do. do. do. 3d,	H. C.
H. B. & A. F. Bancroft, Frankford, Pa., one cock in breeding pen,	H. C.
Thomas R. Cairns, 49 Bishop street, New Haven, Conn., one cock, 2d,	1 50
H. B. & A. F. Bancroft & Co., one hen in breeding pen, 2d,	1 50
do. do. do. do.	H. C.
Harry Jackson, Fiftieth and Pine streets, Philadelphia:	
1 pullet, 2d,	1 50
1 cockerel, 2d,	1 50
1 cockerel,	H. C.
1 pullet,	H. C.
J. D. Nevius, 204 Walnut Place, Philadelphia:	
1 breeding pen chicks, 1st,	4 00
1 cockerel, 1st,	2 00
1 pullet, 1st,	2 00
1 hen, 1st,	2 00
1 cock, 1st,	2 00

Partridge Cochins.

Wilford Corey, Pemberton, N. J.:	
1 breeding pen, 1st,	$4 00
1 cock in breeding pen, 1st,	2 00
1 hen in breeding pen, 1st,	2 00
1 hen in breeding pen, 2d,	1 50
1 cockerel, 1st,	2 00
1 pullet, 1st,	2 00
1 pullet, 2d,	1 50

Light Brahmas.

Charles Schoonmaker, Seirgac, N. J.:	
1 breeding pen, 1st,	$4 00
1 hen, 2d,	1 50
1 cockerel, 1st,	2 00
1 pullet, 1st,	2 00
1 cockerel,	H. C.
1 cockerel, 2d,	1 50
S. S. Bossart, Pughtown, Pa.:	
1 cock, 1st,	2 00
1 hen, 1st,	2 00
1 pullet, 2d,	1 50
1 breeding pen, 2d,	2 00
1 cock in breeding pen, 2d,	1 50
John S. Cope, Germantown Pa., breeding pen, 2d,	1 50
Harry Jackson, 1 breeding pen, chicks,	H. C.
J. D. Nevius, one hen in breeding pen,	H. C.
King's Park Poultry Yard, 1 pullet,	H. C.

Dark Brahmas.

John Lilley, Lambertville, N. J.:	
Breeding pen, 1st,	$4 00
1 cockerel in breeding pen, 1st,	2 00
1 pullet do. 1st,	2 00
1 do. do. 2d,	1 50

Langshans.

George Fox, Torresdale, Pa.:	
1 breeding pen, 1st,	$4 00
1 cockerel in breeding pen, 1st,	2 00
1 pullet in breeding pen, 1st,	2 00
J. Havard Downing, Downingtown, Pa.:	
Breeding pen, 2d,	2 00
Hen, 1st,	2 00
1 cockerel,	H. C.
1 pullet,	H. C.
1 pullet, 2d,	1 50
Charles Thomas, Whitford, Pa.:	
Breeding pen,	H. C.
Cockerel, 2d,	1 50
B. F. Lewis, Gwynedd, 1 hen, 2d,	1 50
John S. Cope, breeding pen, 3d,	1 50

Silver Gray Dorkings.

W. W. Wagner, Germantown, Pa.:	
Breeding pen, 1st,	$4 00
1 cock in breeding pen, 1st,	2 00
1 hen in breeding pen, 1st,	2 00
1 cockerel, 1st,	2 00
1 pullet, 1st,	2 00
B. F. Lewis:	
1 cock, 2d,	1 50
1 hen, 2d,	1 50
John S. Cope:	
Cockerel, chicks, 2d,	1 50
Pullet, chicks, 2d,	1 50

Colored Dorkings.

W. W. Wagner:	
1 hen, 1st,	$2 00
1 cockerel, 1st,	2 00
1 pullet, 1st,	2 00

Silver Penciled Hamburgs.

P. N. Paxson, East Walnut Lane, Germantown, Pa.:	
1 cockerel, 2d,	$1 50
1 pullet, 1st,	2 00
1 pullet,	H. C.
F. K. Bennett, Phillipsburg, N. J.:	
1 cockerel, 1st,	2 00
1 pullet,	2 00
1 pullet, 2d,	1 50
Breeding pen, 1st,	4 00
John Stewart, Easton, Pa.:	
1 spangled cockerel, 1st,	2 00
1 spangled hen, 2d,	1 50
B. F. Lewis:	
1 cock, 1st,	2 00
1 hen, 1st,	2 00
1 breeding pen fowls,	4 00
Thomas Powell:	
1 golden cock, 1st,	2 00
1 golden hen, 1st,	2 00

Golden Penciled.

John Stewart:	
Breeding pen, 1st,	4 00
Cock, 1st,	2 00
Hen, 1st,	2 00
Hen, 2d,	1 50
Pullet, 1st,	2 00
Pullet, 2d,	1 50

Brown Leghorns.

Bayley Fox, 4049 Germantown avenue:	
Cockerel, 2d,	1 50
Pullet,	H. C.

Freeman & Button, Cotton s, N. Y.:	
Cock,	H. C.
Thomas Powell, Thirty-third and Grape street:	
Breeding pen, 1st,	$4 00
Pullet, in breeding pen, 2d,	1 50
Cockerel, 1st,	2 00
Pullet, 2d,	2 00

White Leghorns.

B. F. Lewis:	
Hen, 1st,	2 00
W. S. Miller, Reading:	
Cockerel, 1st,	2 00
Pullet, 2d,	1 50
Pullet, 2d,	1 50
Pullet, 1st,	2 00
Bayley Fox:	
Breeding pen, 3d,	1 50
George Fox:	
Breeding pen, 1st,	4 00
Breeding pen, 2d,	2 00
Cockerel, in breeding pen,	H. C.
Pullet, in breeding pen, 2d,	1 50
Cockerel, in breeding pen, 2d,	1 50
Pullet, in breeding pen, 1st,	2 00
Cockerel, in breeding pen, 1st,	2 00

Black Leghorns.

S. S. Bossart, Pughtown, Pa.:	
Breeding pen, 3d,	1 50
Breeding pen, chicks, 1st,	4 00
Cockerel, in breeding pen, 1st,	2 00
Cock, (fowl,) 1st,	2 00
Cockerel, (chick,) 2d,	1 50

White-Faced Black Spanish.

John Stewart:	
Breeding pen, 2d,	2 00
Cockerel, 2d,	1 50
Pullet, 1st,	2 00
Pullet,	H. C.
Thomas Powell:	
Breeding pen, 1st,	4 00
Cock, in breeding pen, 2d,	1 50
Hen, in breeding pen, 2d,	1 50
Cock, 1st,	2 00
Hen, 1st,	2 00
Cockerel, 1st,	2 00
Cockerel,	H. C.
Pullet, 2d,	1 50

Black Minorca.

Harry Jackson:	
Cock, 2d,	1 50
Pullet, 1st,	2 00

J. D. Nevius:	
Cock, 1st,	$2 00
Hen, 1st,	2 00
Breeding pen, 1st,	4 00
Pullet,	H. C.
Cockerel, 1st,	2 00
Pullet, 2d,	1 50
King's Park Poultry Yard:	
Breeding pen, 3d,	H. C.

Dominiques.

Thomas Price, Chestnut Hill, Pa.:	
Breeding pen, 3d,	H. C.
Pullet, 1st,	2 00
Cockerel, 2d,	1 50
Cockerel, 1st,	2 00
Pullet, 2d,	1 50
John Stewart:	
Breeding pen, 3d,	1 50
Cock,	H. C.
Hen,	H. C.

Plymouth Rocks.

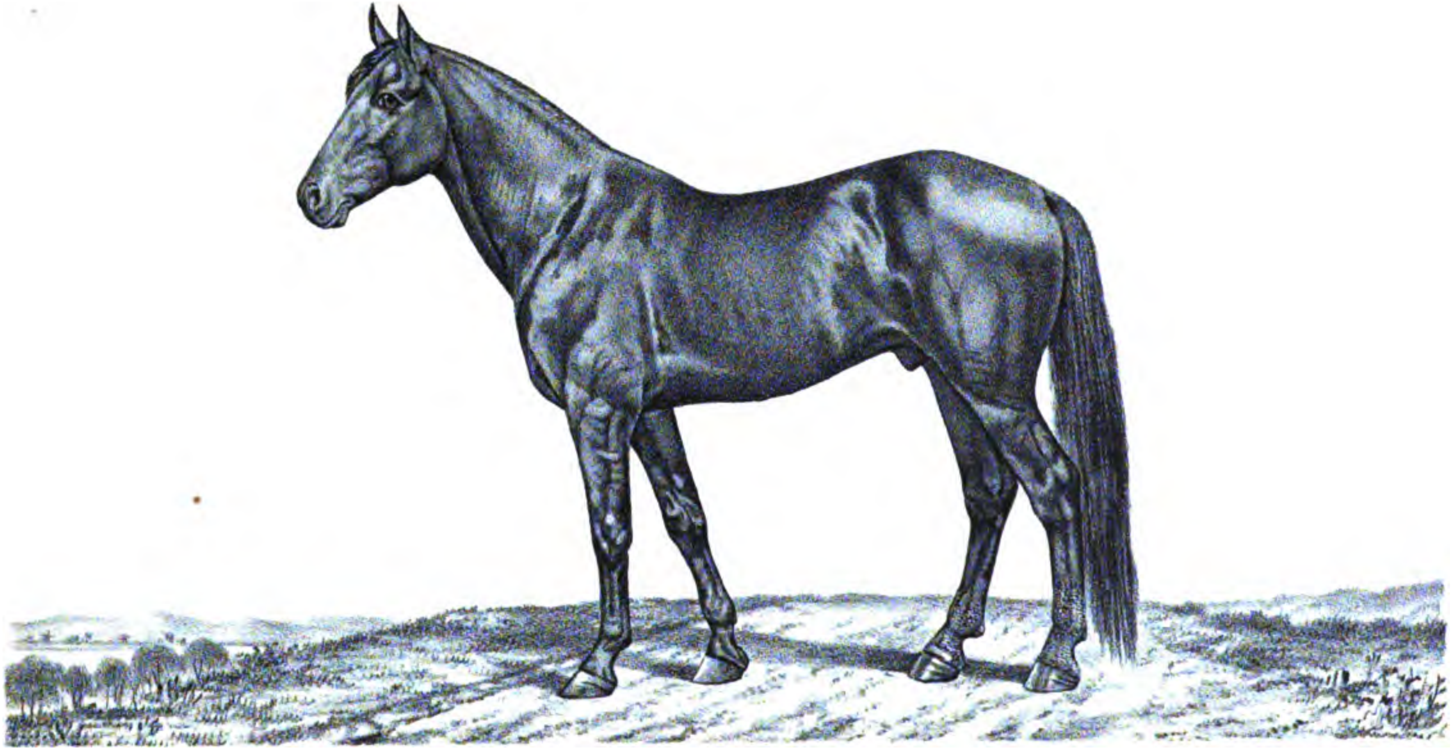
Breeding pen, 3d,	H. C.
Pullet, 3d,	H. C.
Pullet, 2d,	1 50
Levi G. Thomas, Pine Iron Works, Berks county, Pa.:	
Cock, 2d,	1 50
Hen,	H. C.
Pullet, 1st,	2 00
Pullet, 2d,	1 50
Cockerel, 1st,	2 00
Breeding pen, 1st,	4 00
Hen, 1st,	2 00
B. F. Lewis:	
Hen, 2d,	1 50
Cock,	H. C.
Breeding pen, 3d,	H. C.
Peerless Poultry Yards, Ravenna, O.:	
Cockerel, 3d,	H. C.

White Plymouth Rocks.

Belmont Perry, Woodbury, N. J.:	
Cock, 3d,	H. C.
Hen, 3d,	H. C.
Breeding pen, 3d,	H. C.
Cockerel, 3d,	H. C.
Pullet, 3d,	H. C.

Wyandottes.

Charles T. Thomas:	
Breeding pen, chicks, 1st,	
Pullet, 1st,	
Cockerel, 1st,	
Breeding pen, 2d, chicks,	2 00



TENNESSEE WILKES.

Hen, 2d,	$1 50
Cockerel, 2d,	1 50
Pullet,	1 50
Cock,	H. C.
Geo. W. Campbell, 114 Putnam street, Philadelphia, Pa.:	
Breeding pen, 3d,	H. C.
Cock in breeding pen, 3d,	H. C.
Hen in breeding pen, 3d,	H. C.
John S. Cope:	
Breeding pen, 3d,	1 50
H. B. & A. F. Bancroft:	
Breeding pen,	H. C.
Peerless Poultry Yard:	
Cockerel,	H. C.
Pullet,	H. C.
W. S. Stewart, New London, Pa.:	
Cock, 1st,	2 00
Hen, 1st,	2 00
Belmont Perry, white cockerel, 3d,	H. C.

Games.

Belmont Perry:	
Cock, 1st,	2 00
Cockerel, 1st,	2 00
Hen, 2d,	1 50
Pullet, 2d,	1 50
Hen,	H. C.
B. C. Thornton, Oak Lane Station, Philadelphia:	
Breeding pen, 1st,	4 00
Hen, 1st,	2 00
Pullet, 1st,	2 00
Cockerel, 2d,	1 50
M. J. Gorman, Lambertville, N. J., white cockerel, 1st,	2 00

White Games.

B. C. Thornton:	
Breeding pen, 1st,	4 00
Cock, 1st,	2 00
Hen, 1st,	2 00
Hen, 2d,	1 50
Cockerel, 2d,	1 50
Pullet, 1st,	2 00

Black-Breasted Reds.

B. C. Thornton:	
Cockerel, 1st,	2 00
Pullet,	H. C.
M. J. Gorman, Lambertville, N. J., cockerel, 2d,	1 50
Westerfelt, Haywood & Co., Rutherford, N. J., hen, 2d,	1 50
John Fleming, Pencoyd, Pa.:	
Breeding pen, 3d,	1 50
Cock, 2d,	1 50
F. K. Bennett, Phillipsburg, N. J.:	
Breeding pen, 1st,	4 00
Cock, 1st,	2 00

Hen, 1st,	$2 00
Pullet, 2d,	1 50

Black-Breasted Red Games.

James A. Stovell:	
Cock,	H. C.
Hen,	H. C.
Breeding pen, 2d,	$2 00
Cock,	H. C.
Pullet, 1st,	2 00

Brown-Breasted Red Games.

James A. Stovell:	
Breeding pen, 2d,	$2 00
Cock, 2d,	1 50
Hen,	H. C.
F. K. Bennett:	
Breeding pen, 1st,	4 00
Cock,	2 00
Hen,	2 00
Hen,	1 50

Golden Duckwing.

Cock, 1st,	$2 00
Westerfelt, Haywood & Co.:	
Hen, 2d,	1 50

Silver Duckwing.

John Penfield, Ashbourne, Montgomery county, Pennsylvania:	
Cockerel, 1st,	$2 00
Pullet, 1st,	2 00
Pullet,	H. C.

Red Pyle.

B. C. Thornton, Oak Lane Station:	
Breeding pen, 1st,	$4 00
Cock in breeding pen, 1st,	2 00
Hen in breeding pen, 1st,	2 00
Hen in breeding pen, 2d,	1 50

Poultry Games—Black Sumatras.

Belmont Perry:	
Cock, 1st,	$2 00
Hen, 1st,	2 00
Breeding pen, 1st,	4 00
Cockerel, 1st,	2 00
Pullet, 2d,	1 50

Early Derby.

William West, 227 Callowhill street:	
Cock, 1st,	$2 00

Black-Breasted Red Bantams.

John Filking, Orange, New Jersey:	
Cock, 1st,	$2 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00
John Stewart:	
Breeding pen, 2d,	2 00
Cockerel,	H. C.
Hen, 2d,	1 50
Westerfelt, Haywood & Co.:	
Cock,	H. C.
F. K. Bennett:	
Breeding pen, 1st,	4 00
Hen, 1st,	2 00
Hen, 2d,	1 50
Cockerel, 2d,	1 50
Cockerel,	H. C.
Jesse G. Darlington:	
Breeding pen, 3d,	1 50
Hen in breeding pen,	H. C.
Kintner & Co.:	
Cockerel,	H. C.

Brown-Breasted Red Games (Bantams.)

F. K. Bennett:	
Hen, 1st,	$2 00

Black Game.

Westerfelt, Haywood & Co.:	
Cockerel, 1st,	$2 00
Breeding pen, 2d,	2 00
Charles Collins, 3949, Baltimore and Philadelphia:	
Cock, 2d,	1 50
Hen,	H. C.

Red Pyles.

Dr. J. C. Maple, Trenton, New Jersey:	
Hen, 2d,	$1 50
F. K. Bennett:	
Breeding pen, 2d,	2 00
Pullet,	H. C.
Pullet, 2d,	1 50

White Pyle.

Dr. J. C. Maple:	
Hen, 1st,	$2 00

Silver Duckwings (Bantams).

Breeding pen, 1st,	$4 00
Hen, 1st,	2 00
Cockerel, 1st,	2 00
Jesse G. Darlington:	
Breeding pen, 2d,	2 00
Cock in breeding pen, 1st,	2 00
Hen in breeding pen, 2d,	1 50
Dr. J. C. Maple:	
Pullet, 1st,	2 00

Silver Duckwing (Games).

Westerfelt, Haywood & Co.:

Pullet, 2d,	$1 50

Red Pyles.

John Stewart:

Cock,	H. C.

Westerfelt, Haywood & Co.:

Cockerel, 1st,	$2 00
Pullet, 1st,	2 00
Cockerel, 2d,	1 50
Pullet, 2d,	1 50

White Pyles.

Cockerel, 1st,	$2 00
Cock, 2d,	1 50
Cockerel, 2d,	1 50

Brown-Breasted Red Games.

Hen, 2d,	$1 50
Cockerel,	H. C.
Cockerel, 1st,	2 00
Pullet, 1st,	2 00
Pullet, 2d,	1 50
Breeding pen, 1st,	4 00

White Game Bantams.

Cock, 1st,	$2 00
Cock, 2d,	1 50
Pullet, 1st,	2 00

Pyle.

Pullet, 2d,	1 50

Black-Breasted Red Games.

Hen, 1st,	$2 00
Pullet, 1st,	2 00
Hen, 2d,	1 50
Pullet, 2d,	1 50

Pekin Bantams.

Dr. Charles S. Turnbull, Allen Lane, Germantown, Pennsylvania:

Breeding pen, 3d,	$1 50
Cockerel,	H. C.
Pullet, 2d,	1 50

Charles T. Thomas:

Breeding pen, 1st,	4 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00
Cock, 2d,	1 50
Hen, 2d,	1 50

B. S. Koons, Allentown:

Hen, 1st,	2 00

Belmont Perry:	
Cock, 1st,	$2 00
Hen, 2d,	1 50
Cock,	H. C.
Hen,	H. C.
Cockerel, 2d,	1 50
Pullet,	H. C.
Breeding pen, 2d,	2 00

Golden Sebrights.

Cock, 1st,	$2 00
Breeding pen, 1st,	4 00
Hen,	H. C.
Kintner & Co., Dillsburg, Pa.:	
Pullet, 1st,	2 00

Silver Sebrights.

B. S. Koons:	
Pullet,	H. C.
Cockerel, 1st,	$2 00
Pullet, 1st,	2 00
Belmont Perry:	
Breeding pen, 1st,	4 00
Cock, 1st,	2 00
Cock, 2d,	1 50
Westerfelt, Haywood & Co.:	
Cockerel, 2d,	1 50
Pullet, 2d,	1 50
Hen, 2d,	1 50

Gray Sebrights.

Wilfred Corey:	
Cock, 1st,	$2 00
Hen, 1st,	2 00
Cockerel, 1st,	2 00
Pullet, 2d,	1 50

Laced Sebrights.

Dr. J. C. Maple:	
Hen,	H. C.
Cock,	H. C.

Golden Sebrights.

Hen, 1st,	$2 00
Hen, 2d,	1 50
Cock, 2d,	1 50

Duckwings.

F. K. Bennett:	
Breeding pen, 1st,	4 00
Cock, 1st,	2 00
Cock, 2d,	1 50
Hen, 1st,	2 00
Hen, 2d,	1 50
Pullet, 2d,	1 50

Japanese Bantams.

B. S. Koons:	
Cock, 1st,	$2 00
Hen, 2d,	1 50
Pullet, 1st,	2 00
Belmont Perry:	
Cock,	H. C.
Hen, 1st,	$2 00
Breeding pen, 1st,	4 00
Cock, 2d,	1 50
Hen,	H. C.

White Polish.

Cock, 2d,	$1 50
Hen, 2d,	1 50
Breeding pen, 1st,	4 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00
Cock, 1st,	2 00
Hen, 1st,	2 00

Booted Bantams.

Hen, 1st,	2 00

Black African.

Cock, 2d,	1 50
Hen,	H. C.
Breeding pen, 2d,	2 00
Schum & Lippold, Lancaster, Pa.:	
Cock,	H. C.

Rose-Comb Black African.

J. C. Maple:	
Breeding pen, 1st,	$4 00
Cock, 1st,	2 00

White Rose Comb.

Pullet, 1st,	2 00
B. S. Koons:	
Pullet, 1st,	$2 00
Pullet, 2d,	1 50
Hen, 1st,	2 00

Black Rose Comb.

J. C. Maple:	
Cockerel, 1st,	$2 00
Pullet, 1st,	2 00
Hen, 2d,	1 50

Cuckoo.

Belmont Perry:	
Hen, 1st,	$2 00

Crevecours.

Charles T. Thomas:	
Breeding pen, 1st,	$4 00
Breeding pen, 2d,	2 00
Cock, 1st,	2 00
Hen, 1st,	2 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00
Cockerel, 2d,	1 50
Pullet, 2d,	1 50

La Fleche.

J. D. Nevius:	
Cock, 1st,	$2 00
Hen, 1st,	2 00

Court Pettie.

Cock, 1st,	$2 00
Hen, 2d,	1 50
Hen, 1st,	2 00

Houdans.

John S. Cope:	
Breeding pen, 1st,	$4 00
B. F. Lewis:	
Cock, 2d,	1 50
Hen, 2d,	1 50
Cock,	H. C.
Hen,	H. C.
King's Park Poultry Yards:	
Cock, 1st,	$2 00
Hen, 1st,	2 00
Cockerel,	2 00
Pullet, 1st,	2 00
Breeding pen, 2d,	2 00

Black White-Crested.

S. S. Bossart:	
Breeding pen, 2d,	$2 00
Cock,	H. C.
Hen,	H. C.
Cock, 2d,	1 50
A. B. Seymore, Ravenna, Ohio:	
Cock, 1st,	2 00
Hen, 1st,	2 00
Breeding pen, 1st,	4 00
Hen, 1st,	2 00
Hen, 2d,	1 50

Buff Polish.

Belmont Perry:	
Cock, 1st,	$2 00
Hen, 1st,	2 00

Golden Polish.

Cock, 1st,	$2 00
Hen, 1st,	2 00
Breeding pen, 1st,	4 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00

Rumplers.

B. F. Lewis :	
Cock, 1st,	$2 00
Cock, 2d,	1 50
Hen, 1st,	2 00
Hen, 2d,	1 50
Hen,	H. C.

Frizzled.

Cock, 1st,	$2 00
Hen, 1st,	2 00
Hen, 2d,	1 50

Silkies.

Belmont Perry:	
Cock, 1st,	$2 00
Hen, 1st,	2 00
Breeding pen, 1st,	4 00
Cockerel, 1st,	2 00
Pullet, 1st,	2 00

Bronze Turkeys.

B. F. Lewis :	
First,	$4 00

CLASS 30—AQUATIC FOWLS.

Toulouse geese,	H. C.
White China geese,	$2 00
Wild geese,	2 00
King's Park poultry yards :	
Toulouse, 1st,	$2 00
Toulouse, 2d,	1 50

Aylesbury Ducks.

Second,	$1 50
B. F. Lewis :	
Third,	H. C.
Pekin,	H. C.
King's Park poultry yards:	
Pekin ducks, 2d,	$1 50

Pekin Ducks.

W. K. Reese, Garrettsford, Delaware county, Pa.:	
First,	$2 00
Freeman & Button, Cotton's, New York :	
Cayuga, 2d,	$1 50

King's Park poultry yards:	
Cayuga,	H. C.
First,	$2 00
James A. Stovell:	
White Call, 1st,	$2 00
B. F. Lewis:	
Crested White, 1st,	$2 00
Crested White, 2d,	1 50

White Guineas.

First,	$1 50
Pearl, 1st,	1 50
Pearl, 2d,	1 00

Rabbits.

Madagascar,	H. C.
Himalaya, 1st,	$1 00
Angora, 1st,	1 00
Imported Belgian, 1st,	1 00
Egyptian, 1st,	1 00
Schum & Lippold:	
Madagascar, 1st,	$1 00
William West, Jr., 227 Callowhill street:	
Belgian,	H. C.

Guinea Pigs.

Pink eyes, 1st,	$1 00
Pink eyes,	H. C.
Broken color, 1st,	1 00
Smooth,	H. C.
Smooth, 1st,	1 00
B. F. Lewis:	
Abyssinian, 1st,	$1 00
Smooth broken color, 1st,	1 00
White pink eyes,	Commended.

Incubators and Brooders.

Edwin Andrews, Elmira, New York:	
Three incubators, 2d premium,	$15 00
Buckeye Brooder Company, Ada, Ohio:	
Brooder, 2d premium,	$3 00
W. J. Wagner, caponizing instruments,	Report.

The committee consider the instruments very simple in construction, good in workmanship, and complete for the purpose.

CLASS 31—Pigeons, and Cage and Ornamental Birds.

Pigeons.

White fantails, 1st,	$ 1 50
Thomas R. Cairns, New Haven, Conn.:	
Blue pouters, commended.	
F. F. Kamp, 1123 Poplar street, Philadelphia:	
Black pouters, 2d,	1 00
Blue pouters, 1st,	1 50

Blue pouters, 2d,	$1 00
Blue pouters, 3d,	H. C.
Yellow pouters, 1st,	1 50
Yellow pouters, 2d,	1 00
Red pouters, 1st,	1 50
White pouters,	Commended.
White fantails, 1st,	1 50
Edmond deM. Ball, Station F, Philadelphia:	
White fantails,	Commended.
David A. Nichols, Monroe, Conn.:	
Yellow crested magpies, 1st,	1 50
Blue smooth heads, 1st,	1 50
Black smooth heads, 1st,	1 50
Black smooth heads, 2d,	1 00
William Ehringer, Jr., Philadelphia:	
Black crested, 1st,	1 50
Black crested, 2d,	1 00
Red crested, 1st,	1 50
Red crested, 2d,	1 00
Yellow crested, 1st,	1 50
Yellow crested, 2d,	1 00
James A. Stovell:	
Yellow crested,	H. C.
Black crested,	H. C.

Turbits.

Blue veil, 1st,	1 50
Red, 2d,	1 00
Black, 1st,	1 50
Jesse G. Darlington:	
White turbits, 2d,	1 00
Black turbits,	H. C.
William Ehringer:	
Red winged, 1st,	1 50
Yellow winged, 1st,	1 50
Edmond deM. Ball:	
Blue winged, 2d,	1 00

Jacobins.

Geo. Clothier, Jr., No. 1727 N. 18th street:	
2d,	1 00
William Ehringer:	
Yellow, 1st,	1 50
Black, 2d,	1 00
Red,	H. C.
F. F. Kamp:	
White, 1st,	1 50
Red, 2d,	1 00
Jesse G. Darlington:	
Black, 1st,	
Red, 1st,	

Tumblers.

Martin Hoeffer:	
Blue feather legged, 1st,	1 50
Black beard, 2d,	1 00

Thomas R. Cairns:	
Short faced red, 1st,	1 50
Almond, 1st,	1 50
Yellow, 1st,	1 50
Black kite, 1st,	1 50
Yellow, 2d,	1 00
Thomas Scholes, Philadelphia;	
Blue bald, 1st,	1 50
Schum & Lippold:	
Blue bald,	H. C.
James A. Stovell:	
Yellow, 1st,	1 50
Dun, 1st,	1 50
Black, 1st,	1 50
Yellow, 2d,	1 50
Red, 2d,	1 00
Red, 1st,	1 50
Jesse G. Darlington, yellow bald, 1st,	1 50

Dragons.

David A. Nichols:	
White, 1st,	$1 50
White, 2d,	1 00
Schum & Lippold:	
Black, 1st,	1 50
Blue, 1st,	1 50

Moorcaps.

James A. Stowell, back, 1st,	1 50

Nuns.

Daniel A. Nichols:	
Black, 1st,	1 50
Red, 1st,	1 50
Yellow, 1st,	1 50

Trumpeters.

Schum & Lippold, 1st, black,	1 50

Short-Faced Antwerps.

James A. Stovell:	
White, 1st,	1 50
Blue check, 1st,	1 50
Blue, 2d,	1 00
Black, 2d,	1 00
Ash, 2d,	1 00

Starlings.

Schum & Lippold, 2d,	1 00

Duchies.

F. F. Kamp, 1st,	1 50
J. A. Stovell, best starlings, 1st,	1 50

Blondinettes.

Thomas Scholes:	
Spangled, 1st.,	1 50
Blue, 2d,	1 00

Satinets.

Spangled, 2d,	1 00

Quakers.

James A. Stovell, 1st,	1 50

Archangels.

Schum & Lippold, 1st,	1 50
Daniel A. Nichols, 2d,	1 00

Long-Faced Antwerps.

B. F. Lewis:	
Red check, 1st,	1 50
Silver, 1st,	1 50
George Fox, white, 1st,	1 50
James A. Stovell, red check, 2d,	1 00

English Owls.

J. A. Stovell:	
Standard blue English owls, 1st,	1 50
White, 2d,	1 00
Martin Hoeffer,	Commended.
Thomas Scholes:	
Silver, 1st,	1 50
White, 1st,	1 50
Powdered, 2d,	1 00
Black-tailed,	Commended.
Jesse G. Darlington:	
Silver, 2d,	1 00
Blue muffed, 1st,	1 50

African Owls.

Thomas Scholes:	
Blue, 1st,	1 50
Blue, 2d,	1 00
Silver, 1st,	1 50
White, 1st,	1 50
Blue,	H. C.
James A. Stovell:	
Blue tail, 1st,	1 50
Black tail, 1st,	1 50
Silver, 1st,	1 00

Chines.

Blue, 1st,	1 50
Red, 1st,	1 50
White, 1st,	1 50
Powdered, 1st,	1 50
Silver, 2d,	1 00

Priests.

Martin Hoeffer:	
Black, white-bar, 1st,	1 50
Blue Brownsmith, 1st,	1 50
Yellow, 1st,	1 50
Schum & Lippold, blue, 1st,	

Barbs.

James A. Stovell, white,	Commended.

Carriers.

Black, 1st,	1 50

Turbits.

Martin Hoeffer:	
Black-tailed, 2d,	1 00
Yellow, 2d,	1 00
Schum & Lippold, silver-winged, 1st,	

Swallows.

William Ehringer, blue bar-less, 1st,	1 50
David A. Nichols, blue bar-less, 1st,	1 00

Fantails.

Yellow smooth-head,	Commended.
Red smooth-head,	H. C.

Helmets.

Schum & Lippold, black, 1st,	1 50

Ice.

1st,	1 50
2d,	1 00

Caged Birds.

H. N. Vahle, 46 North Ninth street:	
Mocking bird, 1st,	1 50
Mocking bird, 2d,	1 00
Parrot, 1st,	1 50
Parrot, 2d,	1 00
Bullfinch, 1st,	1 50
Bullfinch, 2d,	1 00
Goldfinch, 1st,	1 50
Goldfinch, 2d,	1 00
Cockatoo, 1st,	1 50
Nightingale, 1st,	1 50
Cardinal, 1st,	1 50
Cardinal, 2d,	1 00
Pair Ring doves, 1st,	1 50
Pair Ring doves, 2d,	H. C.
Archie M'Kinley, 731 North Seventh street, Philadelphia, pair Ring doves, 2d,	1 00

Ornamental Birds.

William Lindsay, Cotton's, N. Y., pair colored Pea fowls, 1st,	4 00
Belmont Perry, silver pheasants, 1st,	4 00

CLASS 33—BEES.

Henry W. Twining, 1806 North Fifth street, $5 00

Colony of Italian Bees.

Arthur Todd, 1910 Germantown, Diploma.

Colony of Black Bees.

Thomas Paddison, 3269 Ridge avenue, $5 00

Queen Rearing.

Arthur Todd, $5 00

Queen Cells as Actually Built by Bees.

Lemuel Stout, $5 00

CLASS 34.

Comb-Honey.

C. H. Luttgens, Hammorton, N. J., Diploma.

Ten Pounds Comb-Honey.

C. O. Van Dusen, Diploma.

Extracted Honey.

I. H. Martin, Hartford, N. Y., Diploma.

Ten Pounds Extracted Honey.

I. H. Martin, Diploma.

Best and Largest Collection of Honey.

Arthur Todd, Diploma.

I have found some difficulty in making awards, and lack of arrangements in arranging exhibits was the cause of that. Some exhibits could not be passed upon, because they were neither recorded in this book or had cards attached.

S. W. MORRISON, M. D.,
Oxford, Chester county, Pa.

CLASS 35.

Movable Frame Hives.

Arthur Todd, 1910 Germantown avenue, Diploma.

Straw Hive.

Arthur Todd, Diploma.

Apiarian Tools.

Arthur Todd, Diploma.

Apiarian Tools.

C. H. Luttgen—Deserving special mention for beauty of finish.

Honey-Extractor.

Thomas Paddison, Diploma.

Reversible Frame.

Arthur Todd, Diploma.

Samples of Comb Foundation.

Arthur Todd, Diploma.

Appliances for Teaching Bee-Culture.

Arthur H. Todd,	Diploma.

MANIPULATION.

Manipulation and Transferring.

H. M. Twining,	$5 00

Most Skillful Manipulation of the Interior of a Populous Hive.

H. M. Twining,	$5 00

Most Skillful Extraction of Honey from Comb Without Injury to Bees.

H. M. Twining,	$5 00

CLASS 39.

Dairy Products.

Lester Milk Co.: Report not provided for in premium list, yet it deserves the highest commendation.

A. J. Cadwalader, Yardly, Pa., one hundred pounds creamery butter,	Excellent.
A. J. Cadwalader, Yardly, Pa., ten pounds dairy butter,	Excellent.

CLASS 41.

D. Landreth & Son, Philadelphia, best exhibit of seeds and vegetables,	Deserving of highest commendation.

CLASS 43.

Geo. A. Deitz, Chambersburg, Pa., best six bushels wheat,	$10 00
Samuel G. Wilson, Mechanicsville, Pa., best bushel white wheat, 1st,	3 00
D. Landreth & Son, 2d,	2 00
Samuel G. Wilson, best bushel Amber wheat, 1st,	3 00
D. Landreth, 2d,	2 00
Richard C. Kaighn, best bushel long-berry red wheat, 1st,	3 00
Samuel G. Wilson, 2d,	2 00
Samuel G. Wilson, best bushel wheat any other kind, 1st,	3 00
Samuel G. Wilson, best one half bushel wheat, three varieties, each, 1st,	3 00
R. C. Kaighn, best sheaf bearded wheat,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Sen, best sheaf bald wheat,	2 00
S. G. Wilson, 2d,	1 00
Geo. A. Deitz, best display wheat in various forms and sheaf, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
Samuel G. Wilson, best bushel rye,	3 00
Johnston & Stokes, 2d,	2 00
James Cloud, Oxford, Pa., best bushel Cloud's Early Dent corn shelled, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Son, best bushel Flint corn shelled, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Son, best twelve ears yellow Flint corn, 1st,	2 00
D. Landreth & Son, best twelve ears white Flint corn, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
Johnston & Stokes, best twelve ears pop-corn, 1st,	2 00

D. Landreth & Son, 2d,	$1 00
D. Landreth & Son, best sugar corn, nine varieties, three ears each, 1st,	3 00
Samuel G. Wilson, 2d,	2 00
D. Landreth & Son, three stalks wild or native maize bearing ears, 1st,	3 00
Samuel G. Wilson, ten varieties corn on stalk, three of each kind, 1st,	3 00
Johnston & Stokes, best bushel white oats, 1st,	2 00
D. Landreth & Son, best bushel white oats,	2 00
Johnston & Stokes, 2d,	1 00
Samuel G. Wilson, second best sheaf any other variety, 2d,	1 00
D. Landreth & Son, best bushel barley, 1st,	2 00
Johnston & Stokes, 2d,	1 00
D. Landreth & Son, best bushel buckwheat,	2 00
Johnston & Stokes, 2d,	1 00
Johnston & Stokes, best newly introduced cereal, 1st,	5 00
D. Landreth & Son, best six stalks any variety sorghum, 1st,	3 00
D. Landreth & Son, best three stalks any variety sorghum, 1st,	2 00
Johnston & Stokes, best peck sugar peas, 1st,	2 00
Samuel G. Wilson, broom-corn on stalks, 1st,	3 00
D. Landreth & Son, best six heads sunflowers, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Son, Lupin seed, American,	5 00
D. Landreth & Son, collection small seeds, fifty sorts,	5 00
Best bushel clover seed, divided between D. Landreth & Son and Johnston & Stokes, each,	50
D. Landreth & Sons, best collection grass seeds, one fourth bushel, 1st,	3 00
Johnston & Stokes, 2d,	2 00

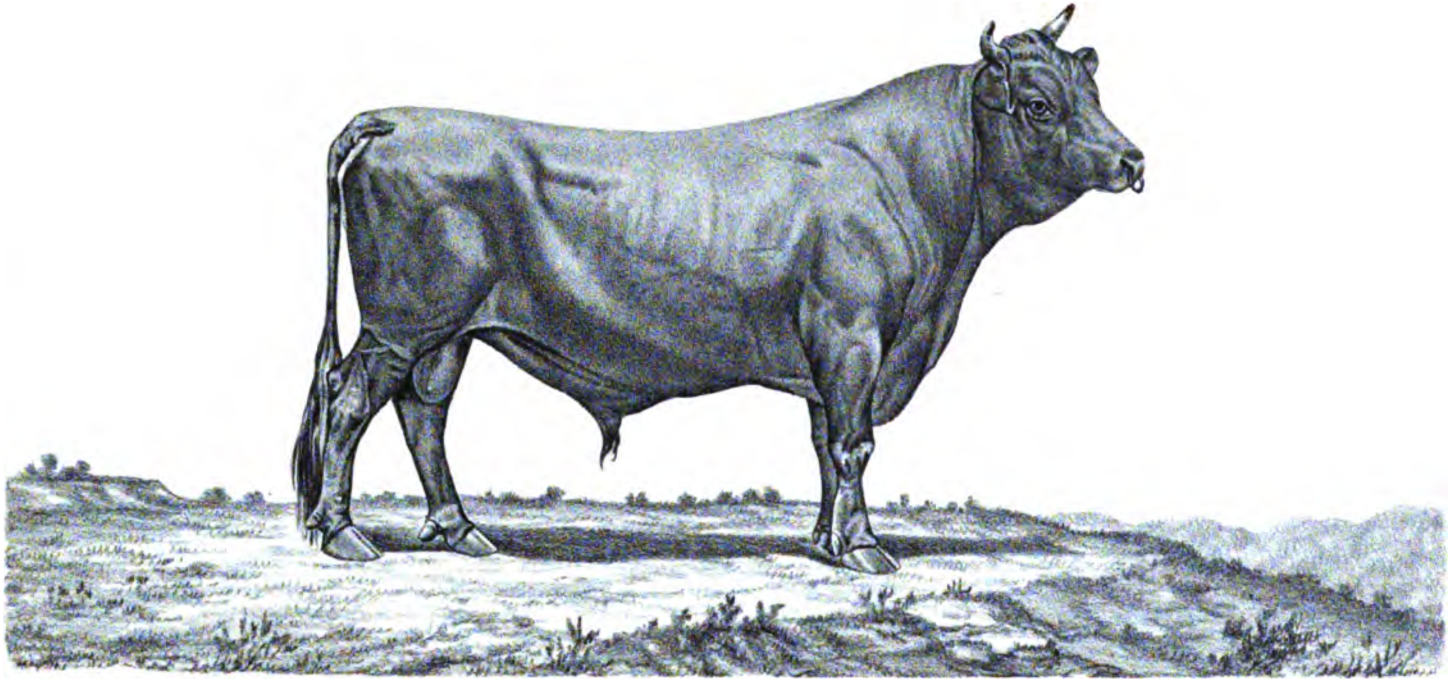
Your committee on Class 42, grain and seeds, respectfully report that the exhibit was very full and has never been surpassed at former fairs. Some articles were yet in the green state—so much so that we were unable to distinguish the variety—for instance, green corn. Your committee, therefore, deemed it proper to pass them by. Some few could not be found, and exhibitors who made the entry did not appear to attend when the committee was serving. The awards are placed as the judgment of the committee determined.

JOHN McDOWELL,
ABNER RUTHERFORD,
Committee.

CLASS 45—VEGETABLES.

Potatoes.

Geo. D. Field & Co., Twenty-second and Passyunk avenue, fifty varieties potatoes, nine specimens each, 2d,	$ 5 00
J. M. Kaighn & Son, Camden, N. J., 1st,	10 00
J. M. Kaighn & Son, twenty varieties, one peck each, 1st,	5 00
J. M. Kaighn & Son, five varieties, one peck each, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
D. Landreth & Son, three varieties wild potatoes, 1st,	5 00
J. M. Kaighn, American seedling, five varieties, 1st,	5 00
D. Landreth & Son, 2d,	3 00
D Landreth & Son, half bushel sweet potatoes, red, 1st,	2 00
Geo. D. Fields, 2d,	1 00



UPROAR, 4609,

WINNER FIRST PRIZE, PHILADELPHIA, 1886. OWNED BY S. KIRKPATRIOK, PHILADELPHIA.

D. Landreth & Son, half bushel yellow sweet potatoes, 1st,	$2 00
Geo. D. Fields, 2d,	1 00
Geo. D. Fields, half bushel yams, 1st,	3 00
D. Landreth & Son, 2d,	2 00
Samuel G. Wilson, best six white flat onions, 1st,	2 00
D. Landreth & Son, 2d,	1 00
Samuel G. Wilson, best six white round onions, 1st,	2 00
Geo. D. Fields, 2d,	1 00
Geo. D. Fields, best six red flat onions, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
Samuel G. Wilson, best six red round onions, 1st,	2 00
Geo. D. Fields, best six yellow flat onions, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
Samuel G. Wilson, best six yellow round onions, 1st,	2 00
Geo. D. Fields, 2d,	1 00
Samuel G. Wilson, best foreign collection, 1st,	2 00
Geo. D. Fields, 2d,	1 00
Geo. D. Fields, best general collection, 1st,	5 00
Samuel G. Wilson, 2d,	2 00
Geo. D. Fields, twelve specimens leeks, 1st,	2 00
D. Landreth & Son, 2d,	1 00
Geo. D. Fields, six turnip form radishes, 1st,	2 00
Geo. D. Fields, six and a half long form, 1st,	2 00
Geo. D. Fields, six long form, 2d,	1 00
Geo. D. Fields, display cattle fielding roots on ground, 1st,	10 00
D. Landreth & Son, 2d,	5 00
J. M. Kaighn, twelve specimens carrots, table use, 1st,	2 00
Geo. D. Fields, 2d,	1 00
Geo. D. Fields, twelve specimens carrots, cattle feeding, 1st,	2 00
D. Landreth & Son, 2d,	1 00
D. Landreth & Son, collection twelve specimens each, of six assorted varieties, 1st,	2 00
Geo. D. Fields, 2d,	1 00
D. Landreth & Son, two dozen specimens beets, table use, 1st,	3 00
George D. Field, 2d,	2 00
George D. Field, long red mangolds, six specimens, 1st,	2 00
D. Landreth & Son, 2d,	1 00
D. Landreth & Son, red globe mangolds, six specimens, 1st,	2 00
George D. Field, yellow globe mangolds, six specimens, 1st,	2 00
D. Landreth & Son, 2d,	1 00
George D. Field, golden tankard mangolds, 1st,	2 00
D. Landreth & Son, 2d,	1 00
D. Landreth & Son, most symmetrical collection, 1st,	3 00
George D. Field, 2d,	2 00
George D. Field, heaviest weight of twenty, 1st,	3 00
D. Landreth & Son, 2d,	2 00
George D. Field, twenty specimens turnips, table use,	2 00
George D. Field, twenty specimens,	2 00
George D. Field, turnips, cattle use, 1st,	3 00
George D. Field, twelve long variety parsnips, 1st,	2 00
D. Landreth & Son, twelve round variety parsnips, 1st,	2 00
D. Landreth & Son, twelve roots, Salsify, 1st,	2 00
D. Landreth & Son, Scornareza, twelve roots, 1st,	2 00

The committee on Group 11, Class 45, are pleased to report the display throughout was very full of the finest specimens. The awards were made with great care, and are respectfully submitted.

JOHN McDOWELL,
ABNER RUTHERFORD,
Committee.

CLASS 46—GRASSES AND GREEN VEGETABLES.

J. M. Kaighn & Son, best collection twenty different genera, 1st,	$10 00
George D. Field, 2d. Very fine and but little inferior to 1st,	Report.
J. M. Kaighn & Son, grasses and foliage plants, 1st,	3 00
Samuel G. Wilson, 2d,	2 00
George D. Field, twelve varieties grass growing in pots, 1st,	3 00
Samuel G. Wilson, newly-introduced grasses, 1st,	3 00
Samuel G. Wilson, best grasses for sandy plains, 1st,	3 00
George D. Field, cucurbitaceous vegetables, 1st,	10 00
D. Landreth & Son, 2d,	Report.
D. Landreth & Son, collection of watermelons, 1st,	10 00
George D. Field, 2d,	5 00
D. Landreth, most perfect specimens, 1st,	3 00
Johnston & Stokes, 2d,	2 00
D. Landreth & Son, three specimens oblong watermelons, 1st,	2 00
D. Landreth & Son, three specimens ovate watermelons, 1st,	2 00
D. Landreth & Son, three specimens oblong, light-skinned watermelons, 1st,	2 00
D. Landreth & Son, three specimens ovate, light-skinned watermelons, 1st,	2 00
Johnston & Stokes, heaviest specimens, 1st,	3 00
D. Landreth & Son, 2d,	2 00
D. Landreth & Son, foreign watermelons, 1st,	3 00
D. Landreth & Son, collection cantaloupes, 1st,	10 00
George D. Field, 2d,	5 00
D. Landreth & Son, three globular, green-fleshed, 1st,	2 00
D. Landreth & Son, three oblong, green-fleshed, 1st,	2 00
D. Landreth & Son, three globular, orange, 1st,	2 00
D. Landreth & Son, three orange-fleshed, 1st,	2 00
D. Landreth & Son, heaviest specimens, 1st,	2 00
D. Landreth & Son, most showy specimens, 1st,	3 00
D. Landreth & Son, best flavored, 1st,	3 00
D. Landreth & Son, summer collection squashes, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
Samuel G. Wilson, twelve specimens, three varieties, 1st,	2 00
D. Landreth & Son, 2d,	1 00
Johnston & Stokes, best summer squashes, foreign variety, 1st,	2 00
Samuel G. Wilson, winter collection squashes, 1st,	2 00
Samuel G. Wilson, best twelve specimens squashes, 1st,	2 00
George D. Field, 2d,	1 00
Samuel G. Wilson, best foreign winter variety, 1st,	2 00
Johnston & Stokes, 2d,	1 00
Samuel G. Wilson, most promising foreign, 1st,	2 00
Johnston & Stokes, 2d,	1 00
Samuel G. Wilson, collection foreign sorts, 1st,	3 00
George D. Field, nine specimens pumpkins, three varieties each, 1st	2 00
Samuel G. Wilson, 2d,	1 00

Samuel G. Wilson, best foreign, 2d,	$1 00
Johnston & Stokes, 1st,	2 00
Johnston & Stokes, most promising foreign, 1st,	3 00
Samuel G. Wilson, 2d,	2 00
Samuel G. Wilson, best collection foreign, 1st,	3 00
Johnston & Stokes, heaviest specimen, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
D. Landreth & Son, Black Spine cucumbers, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
D. Landreth & Son, White Spine cucumbers, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
D. Landreth & Son, field sprouts, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Son, foreign varieties cucumbers, 1st,	5 00
Samuel G. Wilson, 2d,	3 00
Samuel G. Wilson, best collection gourds, 1st,	2 00
George D. Field, 2d,	1 00

Your committee on Class 46 would respectfully submit the following: All specimens were of the highest type of excellence, and reflect great credit upon the producers. Many of the varieties in their respective numbers were new and promise value for general cultivation. Your committee found much on display not entered in competition.

ABNER RUTHEREFORD,
JOHN McDOWELL,
Committee.

George D. Field, six heads broccoli, 1st,	$2 00
John Sherer, Seidersville, Pa., best American bush beans, 1st,	2 00
George D. Field, 2d,	1 00
Samuel G. Wilson, American pole beans, 1st,	2 00
D. Landreth & Son, 2d,	1 00
Samuel G. Wilson, foreign in edible condition, 1st,	2 00
George D. Field, 2d,	1 00
George D. Field, best six specimens flat head cabbage, 1st,	2 00
George D. Field, best six specimens conical head cabbage, 1st,	2 00
George D. Field, best general collection, 1st,	2 00
George D. Field, six heads cauliflower, 1st,	2 00
George D. Field, six heads white dwarf celery, 1st,	2 00
George D. Field, six heads tall white celery, 2d,	1 00
D. Landreth & Son, four round purple egg-plants, 1st,	3 00
George D. Field, 2d,	2 00
D. Landreth & Son, new variety, 1st,	3 00
D. Landreth & Son, twelve specimens Kohl-Rabi, assorted, 1st,	2 00
George D. Field, 2d,	1 00
George D. Field, six heads white cabbage lettuce, 1st,	2 00
George D. Field, coss, 2d,	1 00
D. Landreth & Sons, okra, dish of pods, 1st,	2 00
George D. Field, 2d,	1 00
D. Landreth & Son, twenty specimens peppers, four varieties, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
D. Landreth & Sons, six bell or bull nose, 1st,	2 00
John Sherer, 2d,	1 00
Samuel G. Wilson, six best new varieties, 1st,	2 00
George D. Field, six heaviest stalks rhubarb, 1st,	2 00

George D. Field, spinach finest leaves, 1st,	$2 00
D. Landreth & Son, second best tomatoes, nine specimens, 2d,	1 00
Samuel G. Wilson, 1st,	2 00
D. Landreth & Son, thirty specimens, nine varieties, 1st,	5 00
George D. Field, 2d,	3 00

We, the undersigned committee, appointed to judge the products contained in Class 46, Group 11, beg leave to report that after having examined all the varieties enumerated, submit the above awards as correct to the best of our judgment.

DAVID H. BRANSON,
JOHN McDOWELL,
Committee.

CLASS 47—STONE FRUITS AND POMACEOUS FRUITS.

Duncan Rhind, Torresdale, Pa., best six bunches, six varieties, foreign grapes, 1st,	$5 00
David Ferguson & Sons, Ridge and Lehigh avenues, 2d,	3 00
Duncan Rhind, 3 bunches Black Hamburg, 1st,	3 00
David Ferguson & Son, 2d,	2 00
Duncan Rhind, three bunches Muscat, 1st,	3 00
David Ferguson & Son, any other variety, 1st,	3 00
Duncan Rhind, 2d,	2 00
Duncan Rhind, best display foreign,	10 00
Joel Horner & Son, Merchantville, N. J., largest number of native grapes, sixty varieties,	20 00
Joel Horner & Son, largest number natives, thirty varieties,	15 00
Joel Horner & Son, twenty varieties natives, three bunches each,	10 00
Joel Horner & Son, ten varieties natives, three bunches each,	5 00
Patrick Coonohan, Shoemakertown, Pa., best six bunches Concord, 1st,	2 00
Joel Horner & Son, six bunches Niagara, 1st,	2 00
Joel Horner & Son, six bunches Brighton, 2d,	1 00
Joel Horner & Son, six bunches Delaware, 1st,	2 00
P. Coonohan, 2d,	1 00
Joel Horner & Son, any new variety, 1st,	2 00
Joel Horner & Son, any new hardy variety, 1st,	2 00
P. C. Hiller, Conestoga, Pa., peaches, ten varieties, six specimens each, 1st,	10 00
Henry D. Culen, Homesport, N. J., late Crawford, 1st,	2 00
G. Hiester, Harrisburg, 2d,	1 00
P. C. Hiller, Susquehanna, 1st,	2 00
G. Hiester, Susquehanna, 2d,	1 00
G. Hiester, Smock, 2d,	1 00
H. D. Culin, " Stump the World," 1st,	2 00
P. C. Hiller, " Stump the World," 2d,	1 00
H. D. Culin, " Old Mixon," 1st,	2 00
P. C. Hiller, " Old Mixon," 2d,	1 00
P. C. Hiller, Maggie, 1st,	2 00
Geo. D. Field, basket, six varieties, 1st,	2 00
P. C. Hiller, best general collection, 1st,	10 00
Daniel Carwither, Frankford, Pa., seedling peaches, recommend special premium,	2 00
John Sherer, plums, any variety, 1st,	2 00
Neuberry Fritz, 2d,	1 00

William Parry, Parry, N. J., collection fifty varieties pears, three each, 1st,	$25 00
William Parry, best and largest collection,	20 00
J. M. Kaighn & Son, collection twenty varieties, 2d,	3 00
Wm. Parry, 1st,	5 00
J. M. Kaighn & Son, Bartlett, 1st,	2 00
Gabriel Hiester, 2d,	1 00
Gabriel Hierter, Seckel, 1st,	2 00
Wm. Parry, Seckel, 2d,	1 00
Gabriel Hierter, Buerri D'Anjou, 1st,	2 00
Thomas L. Noble, 2d,	1 00
Thomas L. Noble, Doyenne Boussock, 1st,	2 00
L. Montford, Hammontown, N. J., Lawrence, 1st,	2 00
Gabriel Hiester, 2d,	1 00
Gabriel Hiester, Sheldon, 1st,	2 00
Thos. L. Noble, 2d,	1 00
Gabriel Hiester, "Belle Lucrative," 1st,	2 00
Wm. Parry, 2d,	1 00
Gabriel Hiester, Howell, 1st,	2 00
Wm. Parry, 2d,	1 00
L. Montford, Duchess D'Angouleme, 1st,	2 00
Gabriel Hiester, 2d,	1 00
Gabriel Hiester, Louise Bonne, 1st,	2 00
J. M. Kaighn & Son, Winter Nelis, 1st,	2 00
John Sherer, 2d,	1 00
Gabrrel Hiester, Buerri Bosc, 1st,	2 00
Wm. Parry, 2d,	1 00
Wm. Parry, Leconte, 1st,	2 00
H. C. Young, Buerri Did, 2d,	1 00
Gabriel Hiester, six fall varieties, 1st,	3 00
Wm. Parry, 2d,	2 00
Wm. Parry, six winter varieties, 2d,	2 00
J. M. Kaighn & Son, best arranged basket, 1st,	2 00
Wm. Parry, Oriental,	Special mention.
P. C. Hiller, apples, best collection, twenty-five varieties, three each, 1st,	$20 00
Wm. Parry, 2d,	10 00
Wm. Harry, best collection, ten varieties,	10 00
P. C. Hiller, 2d,	5 00
Gabriel Hierter, Baldwin, 1st,	2 00
P. C. Hiller, 2d,	1 00
P. C. Hiller, York Imperial, 1st,	2 00
Gabriel Hiester, 2d,	1 00
Wm. Parry, Smith's Cider, 1st,	2 00
Thomas L. Noble, 2d,	1 00
Thomas L. Noble, Rhode Island greenings, 1st,	2 00
Samuel G. Wilson, 2d,	1 00
Gabriel Hiester, "King of Tompkins County," 1st,	2 00
J. M. Kaighn & Son, 2d,	1 00
Samuel G. Wilson, "Northern Spy," 1st,	2 00
J. M. Kaighn & Son, 2d,	1 00
Samuel G. Wilson, Smokehouse, 1st,	2 00
H. H. C. Pratt, 2d,	1 00
J. M. Kaighn & Son, "Maiden's Blush," 1st,	2 00
Wm. Parry, 2d,	1 00

P. C. Hiller, Rambo, 1st,	$2 00
Gabriel Hiester, Pound, 1st,	2 00
Wm. Parry, 2d,	1 00
Samuel G. Wilson, Golden Russet, 1st,	2 00
Wm- Parry, 2d,	1 00
Wm. Parry, Hubbardston Nonesuch, 1st,	2 00
Gabriel Hiester, 2d,	1 00
P. C. Hiller, Porter, 1st,	2 00
J. M. Kaighn & Son, 2d,	1 00
P. C. Hiller, Mother, 1st,	2 00
Samuel G. Wilson, White Doctor, 1st,	2 00
Wm. Parry, twenty ounce, 2d,	1 00
J. M. Kaighn & Son, six fall varieties, 2d,	2 00
Wm. Parry, 1st,	5 00
Gabriel Hiester, six winter varieties, 1st,	5 00
J. M. Kaighn & Son, 2d,	2 00
David C. Souder, best basket, six varieties,	5 00
J. M. Kaighn & Son, cultivated walnuts,	1 00
E. H. Shroud, 926 Girard avenue, chemically prepared food,	Special mention.

Respectfully submitted.

WM. H. MOON,
GEO. D. STITZEL,
GABRIEL HIESTER,
Committee.

CLASS 49—GROUND, CRUSHED, AND MALTED GRAIN.

George V. Hecker & Co., 49 Water street, Philadelphia:

Winter wheat flour,	Report.
Self-raising flour,	Report.
Self-raising buckwheat,	Report.
Farina,	Report.

Brunswick Manufacturing Company, 235 North Front street:

Buttered, shortened, and self-raising flour,	Report.

CLASS 50—BREAD AND PASTRY.

Millard Cliff Cracker Company:

Best collection pastry,	Report.

CLASS 53—HOPS AND FERMENTED LIQUORS.

Julius Hencke, Egg Harbor, N. J.:

Best collection native wines,	Report.

Isaac Bruner, Muncy, Pa.:

One bottle grape wine,	Report.
One bottle blackberry wine,	Report.
One bottle elderberry wine,	Report.

CLASS 54—GROWING AND ORNAMENTAL PLANTS.

David Ferguson & Sons, twenty-five ornamental foliage plants, 1st,	$30 00
David Ferguson & Sons, six ornamental foliage plants, 1st,	10 00
Christian Eisele, 2d,	5 00
Alfred Warne, twenty-five ornamental foliage plants, 1st,	30 00
Alfred Warne, six ornamental foliage plants, 1st,	10 00
Hugh Graham & Co., twenty palms, ten varieties, 1st,	20 00

Alfred Warne, 2d,	$10 00
David Ferguson & Sons, six marantas, 1st,	10 00
Hugh Graham & Co., 2d,	5 00
Alfred Warne, twelve crotons, 1st,	10 00
D. Ferguson & Son, 2d,	5 00
C. Eisele, six dracaenas, 1st,	5 00
D. Ferguson & Sons, 2d,	3 00
D. Ferguson & Sons, collection new and rare plants, 1st,	20 00
Alfred Warne, 2d,	10 00
Alfred Warne, thirty ferns, ten varieties, 1st,	15 00
Daniel Curtin, 2d,	10 00
Christian Eisele, best display selaginellas, 1st,	10 00
Christian Eisele, twenty-five ferns, twenty-five varieties, 1st,	10 00
Alfred Warne, twelve caladiums,	10 00
D. Ferguson & Sons, 2d,	5 00
C. Eisele, twelve cóleus,	10 00
Alfred Warne, specimen plant in bloom, 1st,	3 00
Daniel Curtin, 2d,	2 00
David Ferguson & Sons, twelve ornamental foliage begonias, 1st,	5 00
C. Eisele, China asters, 1st,	2 00
D. Ferguson & Son, Victoria Regin in bloom, 1st,	20 00
Alfred Warne, hanging-basket, 1st,	3 00
Hugh Graham & Co., best specimen plant, 1st,	10 00
Alfred Warne, 2d,	5 00
A. Black, cacti,	50 00
E. D. Sturdevant, collection water lilies and other aquatic plants, 1st,	25 00
Donald Macqueen, one bed blooming and ornamental foliage plants, special,	100 00
Donald Macqueen, pair Phœnix for date palms, special,	5 00

In the class for six marantas, your judges found some difficulty in making the awards. In Hugh Graham & Co.'s lot there were three very fine specimens, but there were also three that were very inferior, while D. Ferguson & Sons' were all of uniform size and better varieties. In the class for twenty palms, we found, though A. Warne & Sons had some good plants, Hugh Graham & Co.'s were superior in containing newer varieties. In all the other classes we found no difficulty in making the awards as here recorded.

EDWIN LONSDALE,
JOHN NISBET,
WILLIAM JOYCE,
Committee.

W. H. Wyatt, No. 236 North Thirteenth st., bride's bouquet, 1st,	$5 00
W. H. Wyatt, corsage bouquet, 1st,	5 00
Heron & Nesbit, plateau of cut flowers, 1st,	10 00
W. H. Wyatt, 2d,	5 00
W. H. Wyatt, plateau of ferns and foliage, 1st,	5 00
Heron & Nesbit, handle basket cut flowers, 1st,	10 00
Le Roche & Stahl, 2d,	5 00
Hugh Graham & Co., wedding design, cut flowers, 1st,	75 00

ALEXANDER B. SCOTT,
WILLIAM N. CRAWFORD,
THOMAS M. FERGUSON,
Committee.

CLASS 55—Cut Flowers and Designs.

D. Ferguson, general collection,	$5 00
Henry A. Dreer, double dahlias, named, 1st,	3 00
Henry A. Dreer, geraniums, named, 1st,	3 00
Henry A. Dreer, verbenas, named, 1st,	3 00
Henry A. Dreer, petunias, named, 1st,	3 00
Henry A. Dreer, phlox herbaceous, named, 1st,	3 00
C. Eisch, China asters, named, 1st,	3 00
C. Kirchner, seedling, six varieties,	Mention.
O. R. Kreinberger, 1623 Juniata street, collection of pansies, 1st,	3 00

Your committee respectfully submit that the general collection of cut flowers is good, but too small, and does not merit premiums of $15—but as is only collection exhibited, we, therefore, recommend a premium of $5. No premiums offered for seedling carnations, but deserve honorable mention.

Thomas Cartledge,
John Savage,
Daniel Bearn,
Committee.

Designs.

Charles Fox, large canopy, 1st,	$75 00
Hugh Graham & Co., cut flowers, 2d,	50 00
La Roche & Stahl, picture frame, 3d,	30 00
C. Eisch, cut flowers, 4th,	20 00

Your committee respectfully submit that they had great difficulty in deciding between Mr. Graham and Mr. Fox's design. Mr. Graham's design, though large, containing a large amount of flowers, a correct copy of the original, and very elaborate, does not, in the opinion of your committee, display the same taste in arrangements as Mr. Fox's.

Thomas Cartledge,
John Savage,
Daniel Bearn,
Committee.

Hugh Graham & Co., three funeral emblems, 1st,	$50 00
W. H. Wyatt, funeral emblem, 2d,	30 00
Heron & Nesbit, wreath, 14-inch frame, 1st,	8 00
G. A. Laughlin, 2d,	5 00

Thomas Cartledge,
Robert Crawford, Jr.,
August Lutz,
Committee.

Hugh Graham & Co., pillow, 20-inch frame, 1st,	$15 00
Heron & Nesbit, pillow, 20-inch frame, 2d,	10 00
Heron & Nesbit, cross, 18-inch frame, 1st,	8 00
La Roche & Stahl, 2d,	5 00
C. Eisch, anchor, 18-inch frame,	8 00
G. A. Laughlin, 2d,	5 00

Thomas Cartledge,
Robert Crawford, Jr.,
August Lutz,
Committee.

Hugh Graham & Co., table decoration, 1st,	$75 00
Charles Fox, 2d,	50 00

Robert Crawford, Jr.,
Alex. B. Scott,
William N. Crawford,
Committee.

CLASS 56—Freight and Business Vehicles.

Samuel Sturgis, West Manayunk, Pa., self-dumping cart,	Diploma.
Geo. Truman Platt & Co., Trenton, N. J., champion farm wagon,	Diploma.
R. C. Parvin, Pennsgrove, N. J., farm wagon,	Recommended.
R. C. Parvin, Pennsgrove, N. J., Parvin Iron Wagon Co.,	Worthy of notice.
Edward Neal, Jarrettstown, Pa., hay wagon,	Diploma.
Parvin Iron Wagon Co., Pennsgrove, N. J., hay wagon,	Commended.
Parvin Iron Wagon Co., Pennsgrove, N, J., wagon for hauling hay,	Good for the purpose.
W. H. Jones, No. 2043 Market street, Philadelphia, Studebaker farm wagon,	Commended.
Jacob Reed, Eighth and Girard Avenue, Philadelphia, platform spring wagon,	Commended.
George Sergant & Son, Second and Locust streets, Philadelphia, collection wagons,	Diploma.
Kairer & Ehrer, Twenty-second and Race streets, heavy business truck,	Diploma—well constructed.
Geo. Sergant & Son, collection trucks,	Well constructed and worthy.
Ketterer & George, 517 North Twenty-first street, Philadelphia, business wagons,	Excellent.
Fulton, Walker & Co., Twentieth and Filbert streets, light running wagons,	Well constructed and worthy.
Philadelphia Agency of F. J. Heinz & Co., pickle wagon,	Good for the purpose.
Philadelphia Pickling Company, No. 33 South Second street, business wagon,	Commended.
Thomas B. Parker & Son, No. 243 North Broad street, laundry wagon,	Commended.
Edward Neal, light business wagon,	Good.
Cooper, Conard & Co., Ninth and Market streets, delivery wagon,	Commended.
Jacob Reed, Eighth and Girard Avenue, open-side milk wagon,	Diploma.
Jacob Reed, Eighth and Girard Avenue, dearborn wagon, three springs,	Worthy.
Thomas B. Parker & Son, transfer coach,	Worthy.
C. F. Walborn, 1117 Filbert street, harness mounting,	Diploma.
George M. Reese, Bird-in-Hand, Pa., wagon jack,	Good.
E. H. Ryon, 2431 Frankford, Philadelphia, golden eagle wagon jack,	Diploma.
J. L. Worrall, 1424 Bouvier street, bag truck,	Worthy.
D. McMurray, Germantown, collection wagon material,	Worthy of notice.

CLASS 57—PLEASURE CARRIAGES.

J. D. Harper, Christiana, Pa., extension jump-seat carriage,	Worthy.
McLear & Kendall, No. 220 North Broad street, close carriage, (falling-top.)	Diploma.
J. D. Harper, cut-under depot wagon,	Well finished.
McLear & Kendall, two close carriages, (standing tops,)	Worthy.
McLear & Kendall, rockaway,	Diploma.
Horace Erwin, Shoemakertown, Pa., cut-under rockaway,	Well worthy.
R. B. Gibb, No. 138 North Broad street, T. cart, (has improved springs and well constructed; we would recommend the highest award,)	Silver medal.
D. P. Nichols, Boston, Mass., four-wheeled Victoria hansom,	Diploma.
J. D. Harper, phaeton,	Recommended.
J. S. Baldwin, 4090 Lancaster avenue, collection phaetons,	Diploma.
J. D. Harper, top buggy,	Worthy.
A. K. English & Co., 1121 Cherry street, buggy,	Good.
McLear & Kendall, buggies,	Recommended.
J. S. Baldwin, top buggy,	Worthy.
J. J. Sowney & Bros., 749 South Fourth street, buggies,	Recommended as worthy of special notice.
Jacob Rech, buggy,	Worthy.
Horace Erwin, buggy top,	Well finished and worthy.
Horace Erwin, cut-under depot wagon,	Diploma.
James Warrington, No. 22 North Broad street, buggies,	Recommended.
R. B. Gibb, No. 138 North Broad street, two-wheeled vehicle made by Fitzgibbon & Co., N. Y.,	Well worthy.
J. D. Harper, Pennock & Curtis patent cart,	Diploma.
R. B. Gibb, two-wheeled vehicle made by Sechler & Co., Cincinnati, O.,	Recommended.
L. F. Castor, Frankford, Pa., road carts,	Recommended.
D. P. Nichols, Boston, Mass., improved hansom and cab,	Worthy.
J. D. Harper, jump-seat sleigh,	Diploma.
R. B. Gibb, extension Surry wagon T. cart,	Highly recommended.
Philadelphia Shifting-Seat Phaeton Company, collection phaetons,	Diploma and recommended.

To A. Wilhelm, President, and to the Executive Committee Pennsylvania State Agricultural Society:

GENTLEMEN: It affords the committee on awards great pleasure in reporting upon this especial exhibit. The chairman has for many years acted upon the awards in this class, and he has the great satisfaction of saying that the display this year is by far superior to the exhibits in any former year, both in class of work and variety, and reflects, in the highest degree, credit alike upon the manufacturers and the society.

W. W. BOYER, *Chairman*,
TOBIAS BARTO,
W. W. SPEER,
Committee.

D. Landreth & Son, Philadelphia, best collection of agricultural inplements and machinery, the production of the exhibitor,	Report.
S. L. Wilson, 250 North Broad street, agricultural implements and machinery,	Report.
W. R. Harrison & Co., Canton, Ohio, feed cutter,	Report.
S. L. Wilson, portable grinding mills,	Report.
W. L. Boyer & Co., root cutter,	Report.
A. B. Farquhar, York, Pa., American cider press,	Report.
Spencer T. Barbor, Rutherford Station, Pa., seed drill regulator,	Report.

CLASS 68—Grinding Stones.

Pike Manufacturing Company, Pike, N. H., scythe stones,	Diploma.

CLASS 69—Metals Cast, Forged, and Rolled.

John J. Knowd, 3824 Warren street, hand-made horse shoes,	Report.

To the President of the State Agricultural Society:

The committee on implements and farm machinery, acting under your instructions, would respectfully report that they entered upon their work, first looking up articles competing, and beg leave to state the exhibits of the three competitors in No. 1275, for grand prizes, were very fine, and of great practical utility, and while each exhibit was large with a different number of articles, yet many implements essential to successful farming were wanting in each, so much so that, in the judgment of the committee, none of them met wholly the requirements of the premium list.

We have also made awards to parties entitled exhibiting other articles.

John McDowell,
David H. Branson,
Committee.

CLASS 70—Engines.

S. L. Wilson, 258 North Broad street, steam engine,	Report.
S. L. Wilson, portable steam engine with boiler,	Report.
S. L. Wilson, stationary steam engine,	Report.
S. L. Wilson, traction engine,	Report.
Harrisburg Foundry and Machine Company, stationary steam engine "Ide,"	Report.
S. C. Harbert & Co., 1907 Market street, traction engine,	Report.
C. D. Young, 42 North Fourth street, Shipman oil-burning steam engine,	Report.
H. Belfield & Co., 435 North Broad street, injector,	Report.
A. B. Farquhar, York, horse-power sweep,	Report.
Alonzo L. Jones, water-wheel,	Report.
Roberts Machine Company, Collegeville, Pennsylvania, two-horse power endless bed,	Report.
A. Blaker & Co., Newtown, Pennsylvania, one-horse power endless bed,	Report.
W. L. Boyer & Bro., one-hore power endless bed,	Report.
J. L. Chalfant & Son, one-horse power endless bed,	Report.

United Manufacturing Company, 49 South Front street, McGahan's lightning boiler-tube cleaner,	Report.
Chalmers Spence Manufacturing Company, 34 South Second street, National tube cleaner,	Report.
T. K. Tyler, Summerfield, Maryland, Kriebel's Progress automatic engine cut-off,	Report.
American Road Machine Company, Kennett Square, Pennsylvania, road machines, report,	Report.
Lamborn Road Machine Company, (Limited,) Media, Pennsylvania, road machine,	Report.
Brodie & Comfort, 15 North Seventh street, Eclipse mud engine,	Report.
R. Kirkwood, Ellicott City, Maryland, iron wind engine,	Report.

CLASS 71—Power Distributors.

Hartman Steel Company, (Limited,) cold die rolled steel,	Report.
H. W. Miller, Jr., 533 Montgomery avenue, Hair and Asbestos Steam Pipe Company,	Report.
James F. Ward & Co., Wilmington, Delaware, Great American pipe covering for steam and hot air,	Report.

A. Wilhelm, Esq., President State Agricultural Society:

Sir: Your committee on Classes 70 and 71, have the honor to submit the accompanying reports, and regret to state that it was impossible, for want of time and means, to make thorough competitive tests of the engines, so can only base their reports upon the opinion of their construction and finish.

We desire, also, to call special attention to the following attractive displays:

S. L. Wilson.
A. B. Farquhar, York, Pennsylvania.
Alonzo L. Jones.
S. C. Harbert, agent Wood, Taber & Morse.
C. D. Young & Bro.
W. L. Boyer & Co.
Union Manufacturing Company.
Chalmers Spence Company.
T. K. Tyler.
Hartman Steel Company.
A. J. Marshbank & Co.

Barton Hoopes,
C. Henry Roney,
Committee.

CLASS 72—Raising and Forcing Water.

Alonzo L. Jones, 114 North Sixteenth street, rotary pump,	Report.
Alonzo L. Jones, steam pump,	Report.
S. L. Wilson, 250 North Broad street, two steam pumps,	Report.
Smith & Woodward, Kalamazoo, Michigan, wind-mill force and lift pump,	Report.
Alonzo L. Jones, hydraulic ram,	Report.
Philadelphia Exhaust Ventilator Company, 121 North Fourth street, Amherst water motor,	Report.

CLASS 73—COMPRESSING AIR.

Champion Blower and Forge Company, Lancaster, Pennsylvania, blacksmith hand blower, ... Report.

CLASS 74—WOOD WORKING.

C. W. & H. W. Middleton, 945 Ridge avenue, fencing tools, ... Report.
E. F. Gleason, America and Susquehanna avenues, band saw, ...
Report and diploma for best collection of wood-working machines.
Gedde & Waters, Thirty-first and Cherry streets, band saw, ... Report.
E. F. Gleason, planing pony, ... Report.
E. F. Gleason, jointing machine, ... Report.
E. F. Gleason, surfacing machine, ... Report.

Mr. President and Gentlemen of the Pennsylvania State Agricultural Society:

Your committee appointed to judge in Groups 20 and 21, Classes 72, 73, and 74, beg leave to state that although the entries were not numerous, they were of superior excellence.

Respectfully submitted.

DAVID H. BRANSON,
Committee.

CLASS 75—METAL-WORKING.

Champion Blower and Forge Company, Lancaster, Pa., tire bender, ... Bronze medal.
Champion Blower and Forge Company, collection of metal-working machinery, ... Bronze medal.
Dieblo Manufacturing Company, Third and Cumberland streets, emery grinding machines, ... Diploma.
J. E. Mitchell, 310 York avenue, collection grindstones, Diploma.
Champion Blower and Forge Company, hand drill, . Diploma.
Gantier Steel Department, C. I. Company, 523 Arch street, wire machinery, ... Diploma.
Oliver & Company, Pittsburgh, Pa., wire machine, . Report.

CLASS 76—QUARRYING AND CUTTING STONE.

A. L. Jones, 114 N. Sixth street, artesian well-drilling machinery, ... Diploma.
Teal Hoist Company, 146 N. Broad street, portable hoist, ... Report.

CLASS 78—MAKING AND WORKING LEATHER.

George A. Smith, 17 S. Fourth street, Philadelphia, sole sewing machine, (McKay,) . . . . Report.
Day Sewed Shoe Manufacturing Company, 23 N. Eighth street:
In-sole, Sanford heel protector, ... Report.
Day sole channeler, ... Report.
George A. Smith, standard button-fastening machine, Report.
Day Sewed Shoe Company, manufactured shoes and process of manufacturing, ... Report.
George A. Smith, sole shaping and channeling, scallop cutting and machine, ... Report.

Wheeler & Wilson Manufacturing Company, 1312 Chestnut street, display shoe-making machinery in operation,	Report.
George A. Smith, shoe machinery,	Report.
Bennett & Hemmingway, 23 North Eighth street, Reese button hole machine,	Report.
Frank D. Weylman & Co., No. 426 Market street, shoe machinery and manufacturer of uppers,	Report.
Frank D. Weylman & Co., No. 426 Market street, Lufslin folder in operation,	Report.

CLASS 79—Fibre Manufacturing.

American B. H. Sewing Machine Company, Twentieth and Washington avenue, blanket and overseaming machine,	Report.

CLASS 83.

W. Alex. Buckley, 1105 Pine street, machine for bottling and packing gold paint,	Report.
Thomas J. Hughes & Sons, 65 North Front street, creamery refrigerator,	Report.

CLASS 84.

Brainard & Armstrong, 621 Market street, sewing embroidery and knitting silk,	Report.
John F. Bailey & Co., No. 22 North Sixth street, twine, sash cord, rope, binders' twine, bags, sacks, &c.,	Diploma.

Your committee on classes 78, 79, and 84, have the honor to submit the accompanying reports, and desire to call special attention to the handsome displays made by all the exhibitors in these classes, particularly in the machinery in motion, showing manufacturing process, for which they deserve much credit, as they were among the principal attractions this year.

Barton Hoopes,
C. Henry Roney,
Commitee.

CLASS 85—Woven and Felted Fabrics.

John Wanamaker, ladies' dress trimmings,	Diploma.
John Wanamaker, upholstery goods,	Diploma.
John Wanamaker, carpets,	Report.
Emily M. Janney, 1800 North Twenty-fourth street, rug—crocheted,	Report.
Cooper & Conard, foreign suits and dress goods,	Report.
Mrs. Lottie Oehninger, 2922 Ridge avenue, embroidered crazy quilt, beautifully made and embroidered,	Report.
W. L. Redpath, 1434 North Fifteenth street, fancy quilt,	Report.
Mrs. Annie W. Eastburn, calico patch work, patches very small and neatly put,	Report.

CLASS 86—Wearing Apparel.

John Wanamaker, men and boys' clothing,	Diploma.
John Wanamaker, silk and felt hats,	Diploma.

Mrs. H. M. Day, 1115 Lehigh avenue, three-cornered fan, oriental fan, and basket fan,	Report.
John Wanamaker, fans,	Diploma.
Mrs. B. Duvall, 2614 Germantown avenue, white crocheted knit quilt, very handsomely made,	Report.
Mrs. E. Fisher, 1809 Fairmount avenue, appliqué and painted quilts,	Report.
Miss Maggie E. Firth, 2616 Germantown avenue, plush lambrequin,	Report.
Harriet Ewing, 4052 Girard street, fancy needle work, (tufted zephyr,)	Report.
John Wanamaker, hand needle-work,	Report or $5
Wheeler & Wilson Manufacturing Co., machine needle work (plain),	Report or $5 00
Mary A. McCoart, 319 North Twenty-second street, hand-made Turkish hair rug (needle work), much taste displayed in the design and execution,	Report.
M. J. Callahan, 1009 Fairmount avenue, hand-quilting on silk (very handsomely done),	Report.
Mrs. H. M. Day, collection of needle-work (very handsome),	Report.
Wheeler & Wilson Manufacturing Co., collection needle-work,	$5 00 or Report.
May C. Davis, 1932 Canal street, embroidered piano scarf, artistic design and beautiful workmanship,	Report.
Miss Mary C. Magee, Eleventh and Lehigh avenues, pair embroidered pillow shams, beautifully embroidered, and entitled to first prize,	$5 00
M. E. Hughes, 1930 Camac street, bed-spread and pillow shams (silk and lace), entitled to first premium for beauty and skill displayed,	5 00
Miss Emma L. Crall, Annville, Lebanon county, Pa., hand-crocheted and embroidered, beautifully crocheted and embroidered,	Report.
Wheeler & Wilson Co., crewel work in artistic designs,	Report or $5 00
Mrs. M. J. Callahan, 1009 Fairmount avenue, table cover (embroidery on light cloth),	Report.
Miss Emma L. Crall, tatting (fine and beautiful work),	Report.
Mrs. Dulton, 2609 North Ninth street, child's crocheted dress,	Report.
Miss Mary Schuck, 2241 North Eighth street, tidy (velvet embroidery), very handsome specimen,	Report.
G. Daniel & Mitchell, gent's shirts (machine work), in large variety and well made,	Report.
Mrs. S. W. Mower, 625 North Eleventh street, lady's dress, very neatly and tastefully made, Hamburg edge,	Report.

A. Wilhelm, Esq., President State Agricultural Society:

Dear Sir: Your committee on Classes 85 and 86 have made the awards as herein recorded, and think the following deserving of special mention for fine displays:

John Wanamaker, Cooper & Conard, Wheeler & Wilson Manufacturing Company, Mrs. H. M. Day, G. Daniel & Mitchell.

C. Henry Roney, *Chairman.*
Mrs. Nettie L. Lefevre,
Mrs. C. Henry Roney.

CLASS 87—From Flour.

Committee on classes 87 and 88 makes the following awards:

To Millward Cliff Cracker Company, 1228 Ridge avenue, and G. Kubler & Co., 258 to 268 North Twenty-second street, Philadelphia, a diploma each for admirable displays of crackers, biscuits, and small cakes.

To John Hartman, 412 South Delaware avenue, Philadelphia, for a unique show of crackers in the form of oysters, a report.

To A. J. Chanveau, 110 North Water street, and W. L. & M. Brown, 1726 Market street, Philadelphia, each a diploma, for equally fine shows of confectionery in all forms and every variety.

To George Boyd & Sons, 13 North Water street, exhibited their "Queen Table Syrup," which your committee takes pleasure in recommending as of the highest order of excellence. A diploma is freely awarded.

The Magic Starch Company, 5 Granite street, exhibited a large stock of their product, which is said to possess great stiffening power. We recommend it to limber-backed statesmen and weak-kneed politicians and others. We award a diploma.

David Taggart.

CLASS 90—Manufacturers of Leather, Horn, and Feathers.

Day Sewed Shoe Manufacturing Company, porpoise leather (new process),	Report.
Charles Jones & Co , 109 North Fourth street, horse clothing, harness mountings, &c.,	Diploma.
Patrick McFadden, 214 North Broad street, improved harness,	Diploma.
Day Sewed Shoe Manufacturing Company, ladies' boots and shoes,	Diploma.
Thomas R. Evans, 40 South Fourth street, Evans' automatical boots and shoes,	Diploma.
Frank D. Wayland, 426 Market street, collection ladies', misses', and children's boots and shoes,	Diploma.
Day Sewed Shoe Company, gents' boots and shoes,	Diploma.
Thomas R. Evans, 40 South Fourth street, patented lasts,	Diploma.
E. Ernst, 453 North Eighth street, ivory and fancy goods,	Diploma.

The exhibits in class 90 were all of superior excellence and did credit to the society as well as exhibitors. Have awarded as above.

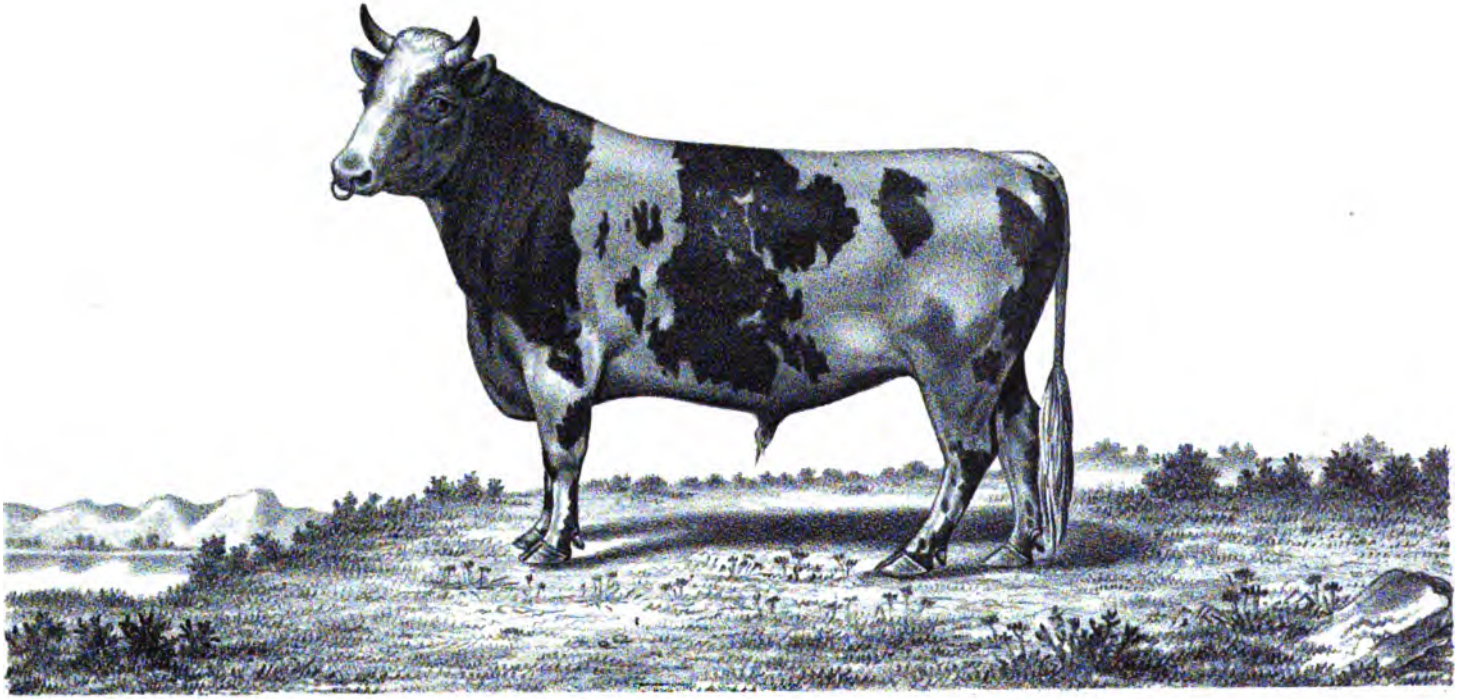
D. H. Branson,
Committee.

CLASS 91—Fat, and Fixed Oils.

M. L. Shoemaker & Co., (Limited,) Venango and Delaware Avenues, animal oil,	Diploma.
George C. Napheys & Son, 310 Spruce street, refined lard,	Diploma.

CLASS 92—Soaps and Perfumery.

J. Eaveson & Sons, 313 North Twentieth street, toilet and laundry soaps,	Diploma—1st premium.
Ardis & Co., Pier 65, Parker wharf, Ardis saving soap, (stands hard water),	Diploma—2d premium.



DUNKELD.

OWNED BY WM. FAIRWEATHER, MEADVILLE, PA. WINNER FIRST PRIZE, PHILADELPHIA, 1886.

M. L. Shoemaker & Co., stearine,	Diploma.
McCambridge & Son, 31 South Sixth street, perfumery toilet preparation,	Diploma.
Arthur Fricke, 218 Arch street, perfumery, very excellent display,	Diploma or Medal.
Walter Sellers, 50 North Delaware avenue, James Pyle's Pearline soap powder,	Diploma.
Vail Brothers, Ideal tooth powder,	Diploma.
P. C. Tomson & Co., granulated solid lye,	Diploma.
P. C. Tomson & Co., ball potash,	Diploma.

Your committee on classes 91 and 92 have made the awards as herein recorded, and think the following are deserving of special mention for fine displays:

M. L. Shoemaker & Co., J. Eavenson & Sons, Arthur Fricke, Walter Sellers.

David H. Branson,
Thomas G. Janvier,
Committee.

CLASS 93—Paints and Colors.

S. F. Woodhouse, Frankford, Pa., Excelsior liquid,	Diploma.
John Lucas & Co., paints,	Diploma.
John Lucas & Co., collection of petroleum products,	Diploma.
John Lucas & Co., best twenty-five pounds white lead,	Diploma.

CLASS 94—Drugs and Chemicals.

W. R. Warner & Co., 1228 Market street, crude drugs,	Diploma.
George B. Kerfort, 206 North Delaware avenue, salt,	Diploma.
Thomas L. Hicks & Co., Fifth and Merchant streets, gold paint,	Diploma.
Parret & Co., Brooklyn, N. Y., lightning eradicator for removing grease and stains from clothing—a most excellent article,	Diploma.

Your committee on classes 93 and 94 find the different exhibits worthy of mention and diplomas as found herein. We would especially commend for fine displays, the paint exhibit of John Lucas & Co., also, the crude drug exhibit of William R. Warner & Co.

Respectfully,
Thomas G. Janvier, *Chairman.*
D. H. Branson.

CLASS 95—Furniture of Wood.

The parlor and hall furniture and the chamber furniture exhibited by John Wanamaker were entirely worthy of reports. They were beautiful in design and excellent in workmanship. The upholstery department of the same exhibit is also worthy of a diploma.

An admirable exhibit of refrigerators was made by the Ridgeway Refrigerator Manufacturing Company of Philadelphia, for which they are fully entitled to a report. A better show in this line your committee has never seen.

Diplomas are recommended as follows: For a collection of chairs, to A. & C. H. Knowlton, of 139 Vine street, Philadelphia. For a folding woven wire spring bed, to William J. Bernstein & Co., Fourth and Vine streets, Philadelphia, and for fancy iron table fire screens. Music racks, to James P. Murphy, 1024 Lombard street, Philadelphia.

David Taggart, *Chairman.*

CLASS 99—Household Machines.

C. C. Housem, 1334 Fairmount avenue, Goodwin's clothes washer,	Report.
Conrow Brothers, 903 Market street, clothes wringer,	Report.
John Wanamaker, display of clocks,	Report.
Conrow Brothers, carpet sweepers,	Report.
American Machine Company,	Report.
Fluting machine,	Report.
Pleating machine,	Report.
Ice cream freezer,	Report.
Cake mixer,	Report.
Clement & Dunbar, ice cream freezer,	Report.
American Button-Hole Attachment Sewing Machine Company, 17 North Fourth street, button-hole attachment,	Report.

CLASS 100—Warming Apparatus.

Charles Williams & Son, 132 Market street, slate mantels,	Diploma.
Samuel Hirst, 18 South Fifth street, wood mantels,	Diploma.
S. G. & W. M. Smith, 638 Arch street, office and parlor gas stove,	Diploma.
S. G. & W. M. Smith, office and parlor petroleum stove,	Diploma.
Job Bartlett's Sons, Tenth and Filbert streets, wrought-iron portable heaters,	Diploma.
James Lanning, Passyunk and Federal streets, patent heater-grates, portable and permanent, hot air and steam,	Diploma.
Job Bartlett's Sons, wrought-iron permanent heater,	Diploma.
Philadelphia Exhaust Ventilator Co., No. 121 North Fourth street, Patton patent hot-water grates,	Report.
James Cairns, Ninth and Jefferson streets, patent bars,	Report.
Charles Williams & Son, permanent heater,	Diploma.

CLASS 101—Culinary Appliances.

French range,	Report.

A. Wilhelm, Esq., *President:*

Your committee on classes 99, 100, and 101 have the honor to submit the accompanying reports, and take great pleasure in calling special attention to the very attractive displays made by the exhibitors in these classes, and more particularly to the following: The Wheeler & Wilson Manufacturing Company, John Wanamaker, The American Button-Hole Sewing Machine Company, Conrow Brothers, American Machine Company, Clement & Dunbar, Charles Williams & Co., and S. G. & W. M. Smith.

Yours respectfully,
C. Henry Roney,
Barton Hoopes,
Committee.

S. G. & W. M. Smith, No. 638 Arch street, gas cooking stove,	Report.
S. G. & W. M. Smith, petroleum cooking stove,	Report.
John Wanamaker, enameled ironware,	Diploma.
John Wanamaker, tinware culinary ware,	Diploma.
George W. Schubert, dairy tinware,	Diploma.

CLASS 102—Ventilators.

Star Ventilating Company, Cherry street below Third, ventilators,	Report.
Philadelphia Exhaust Ventilator Company, No. 121 North Fourth street, Blackman's exhaust wheel,	Report.

CLASS 103—Artificial Illumination.

Pennsylvania Globe Gas Light Company, No. 47 North Second street, gas apparatus,	Report.
Pennsylvania Globe Gas Light Company, No. 47 North Second street, fancy lamps and brackets,	Report.
John Wanamaker, lamps and fixtures, (best,)	Report.
A. J. Wiedner, No. 36 North Second street, Champion headlight oil, hanging, and table lamps,	Diploma.
Hektograph Manufacturing Company, No. 118 South Seventh street, lamp-burners,	Report.

D. H. Nieman,
J. H. Ziegler,
W. W. Speer,
Committee.

CLASS 104—Buildings and Fencing.

David Pettit & Co., No. 1219 Callowhill street, ornamental iron gates and gate-posts,	Diploma.
Carver & Faller, No. 1018 Chestnut street, stained glass substitute,	Diploma.
James M. Vance & Co., No. 211 Market street, builders' hardware,	Diploma.
James M. Vance & Co., No. 211 Market street, door locks, knobs, &c.,	Diploma.
Edward Sutton, No. 300 Market street, steel posts,	Diploma.
David Pettit & Co., iron fence for garden,	Diploma.
David Pettit & Co., collection iron railways,	Diploma.
Farrel & Co., No. 627 Chestnut street, fire-proof safes,	Diploma.
Dr. Edward Beale, No. 602 South Second street, Beale's patent fire-escape,	Report.
Disston Utility Company, Disston folding-ladder fire-escape,	Diploma.
William G. Henis, No. 1347 Ridge avenue, weather vanes,	Diploma.
Walter Stabler, 19 Park Place, New York, shutter worker,	Diploma.
George W. Ziegler, Tenth and Susquehanna avenue, scaffolding trestling,	Diploma.
George W. Ziegler, bridging,	Diploma.

Silas Land, 1316 Ridge avenue, Land's patent sash lift,	Diploma.
Edward Sutton, 300 Market street, automatic gates,	Diploma.
Edward Sutton, summer house, sofa chairs, &c.,	Diploma.
John Brady, 821 Cherry street, burglar-proof sash and alarm,	Diploma.

CLASS 105.

Walker & Smith, Chambersburg, New Jersey, patent adjustable flower stand,	Diploma.
Trinidad Asphaltum Block Company, Thirtieth and Powelton avenue, Trinidad asphaltum blocks,	Report.
Whilldin & Co., 709 Wharton street, flower pots,	Diploma.
David Pettit & Co., iron work for garden,	Diploma.
Manly, Cooper & Co., Elm avenue and Forty-second street, iron fence, settees, and fancy iron work,	Diploma.
Protection Manufacturing Company, 44 North Fourth street, fire extinguishers,	Report.

D. H. Neiman,
J. H. Ziegler,
W. W. Speer,
Committee.

CLASS 108—Educational Means and Incentives.

E. L. Gates, 19 South Nineteenth street, blackboard, writing desk with scroll of copies,	Report.
Roberts & Fay, display blackboards,	Diploma.
Charles E. Osborn, 1421 Fairmount avenue, shells, minerals, and corals, illustrating natural history,	Report.
E. M. Goldsmith & Co., Sixth and Arch streets, "The Polygraph,"	Report.
Alvah Bushnell, 105 South Fourth street, stationery, &c.,	Report.

CLASS 109—Instruments of Precision.

Thomas H. McCollin, 635 Arch street, photograph apparatus,	Report.

D. H. Neiman,
J. H. Ziegler,
W. W. Speer.
Committee.

CLASS 110—Carved and Moulded.

William Day, 1115 West Lehigh avenue, hammered plaques, (snow scene,)	Report.
J.W. Quinlan, 236 North Eleventh street, (wax flowers,)	Report.
William H. Day, porcelain plaque, (dog's head,)	Report.
William H. Day, porcelain plaque, (fruit,)	Report.
William H. Day, hand-painted vase, (landscape,)	Report.
T. J. Hafner, 12½ North Eighth street, manufacturing Rhine-stone jewelry,	Report.
Mrs. Clark, 2742 Palethorp street, vase wax flowers,	Report.
William C. Randolph, 243 Arch street, turning and carving in vegetable ivory and bone,	Report.

Mrs. H. M. Day, hand-painted quilt,	Diploma.
W. C. Henszey, 828 Arch street, Japanese goods,	Diploma.
Michael Panayotte, Jerusalem, A. M., wood-work, olive, mother-of-pearl, &c.,	Diploma.

CLASS 111—ON PAPER AND CANVAS.

Miss Sarah P. Byrnes, 183 Camac street, India-ink picture, (head Thomas Jefferson,)	Diploma.
F. Gutekunst, 712 Arch street, photographs and phototypes in printers' ink,	Diploma.
Hoffman H. Chase, 137 North Eighth street, ivorytypes,	Report.
S. Stokes, photographs of Lieutenant-Governor Black and Colonel Ricketts, (excellent work,)	Diploma.

CLASS 112—INSTRUMENTS OF MUSIC.

To A. Wilhelm, President:

E. C. Baughn & Co., agents for Boardman & Gray's pianos and Mathusik's pianos; exhibit considered very fine. Entitled to special commendation as to the tone of the instruments and their mechanical structure. Worthy of special mention, record, and report.

T. Schurzer, agent for the Behning pianos and Harrington pianos, both square and upright; exhibit considered excellent, and entitled to most favorable regard.

A. G. Clemmer, agent for the Christy & Co. pianos, and Story & Clark's organs. Your committee do not hesitate to report upon this exhibit as superior in all respects, and well worthy of a diploma.

J. Abrams exhibits the "American Zither." This instrument has attracted much attention, and is worthy of special mention.

J. D. REINBOTH.

CLASS 13.

H. B. Hart, 811 Arch street, velocipede,	Diploma.
H. B. Hart, bicycles,	Diploma.
H. B. Hart, tricycles,	Diploma.
John Wanamaker, implements for ball, archery, &c.,	Diploma.
R. A. Humphreys, 1006 Ridge avenue, tents, hammocks, wagon cover, and camping utensils,	Diploma.
George W. Ziegler, Tenth and Susquehanna avenue, Bluching swing,	Diploma.

GEORGE RHEY.

CLASS 114—UNCLASSIFIED.

Cartwright Metal Roofing Co., corner Broad and Race streets, house covered with tin shingles,	Report.
George B. Soley, 1205 Chestnut street, coining press,	Report.
American Novelty Co., 709 Filbert street, shoes made from straw,	Report.
Weikel, Smith & Co., 133 North Front street, Smyser's automatic package-making and filling machine,	Report.
Hartman Steel Co., (Limited,) 413 Commerce street, steel door mats,	Report.
Hartman Steel Co., (Limited), letters and signs,	Report.

John H. Weistner, 2132 North Eleventh street, nut lock for spring clip of axle of vehicles,	Report.
Hoopes & Townsend, 1330 Buttonwood street, show case bolts,	Report.
George Gifford, 2004 North Broad street, Gifford's patent buggy top,	Report.
C. H. Birchard, 726 Sansom street, folding table,	Report.
Auburn Mineral Spring Water Company, 912 Race street, mineral spring water,	Report.
Edward Lauderbeck & Company, 413 South Fifth street, combination tool,	Report.
William Heaton, 503 Chestnut street, display of rubber goods,	Report.
Gum belting,	Report and diploma.
Gum hose,	Diploma.
An excellent display worthy of special mention.	
The Chalmers–Spence Company, 34 South Second street, asbestos products, fiber crude packing, &c.,	Report.
A. L. Butz, 212 Market street, corks, raw and manufactured, cork machine in operation,	Report.
P. J. Syman, 102 Arch street, picture frame of oars and sea-shells,	Good report.
Philadelphia Ornamental Wire Company, 18 North Sixth street, wire goods for household uses,	Report.
S. S. White Dental Manufacturing Company, mouth preparations,	Report.
E. R. Taylor, Trenton, New Jersey, picture hanger,	Report.
W. W. Richard, 3845 Fairmount avenue, patent window,	Report.
Wound Material Company, 1301 Buttonwood street, twine unwinder,	Report.
Raymond Manufacturing Company, Corry, Pa., baby swing and jumper,	Report.
R. B. Gibb, 138 Broad street, agent for Hollis Spring Company, Olean, New York, ram's horn carriage springs,	Report.

BARTON HOOPES,
TOBIAS BARTO,
Committee.

Mr. President and Gentlemen of the Pennsylvania State Agricultural Society:

Your committee, appointed to examine the Berry Harvester, Chester, Pa., beg leave to state that whilst this machine is not offered in the market, yet it is the first and only one of the kind ever constructed, as claimed by the projector, to automatically cut and bind grain, using straw for bands, and did its work entirely satisfactory to your committee, and would recommend that it be awarded a diploma.

All of which is most respectfully submitted.

DAVID H. BRANSON,
JOHN McDOWELL,
Jury.

Pennsylvania State Agricultural Society—Thirty-second Annual Exhibition, Philadelphia, 1886 :

List No. ——; exhibit No. ——; object, culinary beaters, &c., exhibited by the Keystone Manufacturing Company, 119 Craven street, Philadelphia, Pa. The jury on class ——, consider this exhibit as worthy of a report, for the following reasons: Bread kneader, egg beater, batter mixer, vegetable and fruit whip, peach stoner, combination grater and slicer, churn and potato whip, all of which, in a practical test, gave entire satisfaction to your committee, and merited this award.

(Signatures of jury) DAVID H. BRANSON.

List No. ——; exhibit No. ——; object, mower and reaper, exhibited by ————————. The jury on class ——, consider this exhibit as worthy of a report, for the following reasons: This exhibit, Poulson's mower and reaper knife grinder, is especially adapted to the purpose for which it is intended, and take great pleasure in making this award.

(Signatures of jury) DAVID H. BRANSON.

List No. ——; exhibit No. ——; object, Disc grinding mill, exhibited by A. W. Straub & Co., 3737 Filbert street, Philadelphia. The jury on class ——, consider this exhibit as worthy of a report, for the following reasons: This exhibit, the Disc farm mill, exhibited by A. W. Straub & Co., which is driven by light belt and small power, such as is available by the average farmer, and justly merits this award.

(Signatures of jury) DAVID H. BRANSON.

List No. ——; exhibit No. ——; object, Worrell bag holder, exhibited by J. L. Worrell, 1534 Fawn street, Philadelphia. The jury on class ——, consider this exhibit as worthy of a report' for the following reasons: It may be adjusted at any height, and is arranged for attachment to the platform of scales so as not to interfere with weighing.

(Signatures of jury) DAVID H. BRANSON.

Mr. President and Gentlemen:

Your committee appointed to adjudge the refrigerators on exhibition would most respectfully call your attention to the exhibits made by the Ridgway Refrigerator Company, Limited, office 531 Commerce street, Philadelphia. A practical test of these refrigerators showed great merit, and all that was claimed for them, and would recommend in justice to the parties that a diploma be awarded, as the showing made would certainly justify your committee in making this award.

DAVID H. BRANSON,
JOHN N. CHALFANT,
Jury.

"STORM KING," Winner 1st Prize, Philadelphia, 1886. For pedigree see next page.

Pedigree of STORM KING 2161.

Sire HAPPY MEDIUM 400.	Hambletonian 10,	Abdallah 1,	Mambrino,	Imperial Messenger,	English Mambrino.
				Daughter of,	Imperial Saur Kraut.
			Amazonia.		
		Charles Kent Mare,	Imperial Bellfounder.		
			One Eye,	Bishop's Hambletonian,	Imperial Messenger.
				Silver Tail,	Imperial Messenger.
	Princess 2.30,	Andrus' Hambletonian,	Judson's Hambletonian,	Bishop's Hambletonian,	Imperial Messenger.
				Daughter of,	Wells' Magnum Bonum.
		Wilcox Mare,	Burdick's Engineer,	Engineer,	Imperial Messenger.
Dam TOPSY TAYLOR.	Alex. Norman, 25,	Morse Horse 6,	European.		
			Beck,	Harris' Hambletonian,	Bishop's Hambletonian.
				Mozza,	Peacock.
		Slocum Mare,	Magnum Bonum.		
	Daughter of,	Howard's Sir Charles,	Clinton,	Sir Charles.	
				Daughter of,	Sir Alfred.
		Daughter of,	Smith's Messenger,	Dill's Messenger.	

STORM KING 2161.—Bay stallion; few white hairs in forehead, little white on right hind foot; stands 16 hands. Foaled April 12, 1882. Bred by Gen. William T. Withers. Property of Daniel G. Engle, Marietta, Pa., Engletree Stock Farm.

PENNSYLVANIA STATE FAIR, 1886. SECTION I.

By C. HENRY RONEY, *Engineer and Architect, 110 South Fourth Street, Philadelphia.*

The society's exhibition this year, as a whole, has undoubtedly been the best it has ever given. The buildings were filled with a choice collection of exhibits, which were generally displayed to better advantage than usual, and it is a matter for congratulation that so many of the exhibitors responded so willingly to the request to show their manufacturing processes and machinery in motion. Everything of that kind adds to the attractiveness of an exhibition, increases its popularity, and makes it more instructive to visitors. Those exhibits where any manufacturing was carried on or machines were shown in operation were those which attracted the most attention, left a lasting impression on those present, and should be encouraged as much as possible. The following report will be restricted to a reference to some of the improvements patented or brought out since the last exhibition:

DEPARTMENT III.—Implements and Machinery for Transportation and for Agriculture.

GROUP XVI—Transportation.

GROUP XVII—Miscellaneous.

AGRICULTURAL IMPLEMENTS AND MACHINERY.

In these groups, embracing wagons and vehicles of all descriptions, machines for preparing the soil, planting, fertilizing, harvesting, and preparing for market, the exhibits were numerous and varied; most of the improvements, however, were of a minor character, and not radically different from those referred to in former years, except in details difficult to explain without voluminous illustrations and descriptions.

The exhibits of harvesting machinery, including mowing-machines, reapers, and binders, was large, varied, and very creditable to the exhibitors, but there were comparatively few radical departures from the forms shown last year and others described in former annual reports, but there were some decided improvements in some of the machines, in the materials used and in details of construction. In some cases, steel and malleable iron were substituted for wrought-iron and cast-iron formerly used, making the frames and parts lighter, stronger, and more durable than formerly.

The opportunities which exhibitions such as this afford to manufacturers of being able to show to the users the machines and articles which are best adapted to their needs, is illustrated by the statement of the sales made by one alone of the most striking and notable, that of the "CHAMPION" harvesters, made by WHITELY, FASSLER & KELLY, Springfield, Ohio; L. H. LEE & BRO., Baltimore, and A. A. HAMILTON, 3302 Lancaster avenue, Philadelphia, agents, who state that they sold on the fair-grounds, from September 6 to 18, 1886, one hundred and thirty-seven "Champion" machines, aggregating about fourteen thousand (14,000) dollars, for the 1887 harvest, and gives hint to exhibitors having the best machinery improved to meet the demands of buyers of the advantages derived from a proper exhibit at the Pennsylvania State fair.

The magnitude of the "Champion" exhibit can only be correctly conceived by the fact that it comprised seven (7) car loads, or one hundred and sixteen machines, with tents and motive power. Their machines were constructed of steel and malleable iron, with a number of improvements in details, displaying much ingenuity, excellent workmanship, and adaptation to the purposes for which they are designed.

The Walter A. Wood Mowing and Reaping Machine Company, Hoosick Falls, N. Y., W. F. Lippincott & Co., agents, made another handsome display of their mowers, reapers, and binding harvesters, in which many minor improvements have been recently made.

The new Enclosed Gear Light Reaper, Fig. 1, is unique in severa respects. It weighs no more than many mowers, yet has all the usual reaper adjustments and parts. The enormous amount of harvesting machinery manufactured in this country may be judged from the statement of this firm, that during the past thirty-four years they alone have placed six hundred and twenty thousand six hundred and nine of the Wood machines in the hands of the farmers.

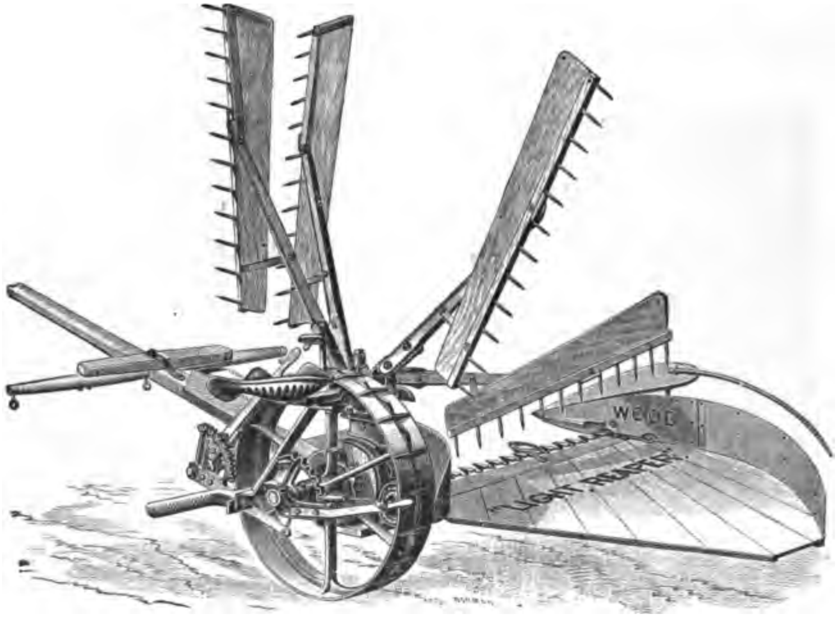


FIG. 1.

The Berry Harvester Company, of Chester, Pa., showed their new straw binder, which attracted much attention. The machine uses a single band or simple wisp of straw. They select the largest untangled grain in the field, and cut it before it is too ripe, and use it for bands. The band reservoir will need to be filled once for each acre cut, as grain is ordinarily cut; it is claimed these bands will cost absolutely nothing, and will not be threshed out.

The inventor prefers the small bundles made necessary in using the single band above, rather than to manipulate the straw in forming larger bands, for, by so doing, the machinery would be more complicated, and probably thresh out the grain. He claims that this machine will separate each bundle from the rest completely and thoroughly in the most tangled grain, and will save, at the present price of twine, about twenty-five cents per acre, or from fifteen to fifty dollars per year for each machine.

SECTION II. DEPARTMENT IV.

MINERALS, METALS, MACHINERY, AND TOOLS, GENERAL.

GROUP XVIII—Minerals and Metals.

The Hartman Steel Company, (Limited,) Beaver Falls, Pa., Hicks & Dickey, agents, 413 Commerce street, Philadelphia, made a large display of steel wire nails, cold die rolled steel, for shafting and piston rods, steel signs, and their patent steel wire door-mat, Fig. 2, made from steel wire, with steel frame and steel braces, all perfectly galvanized.

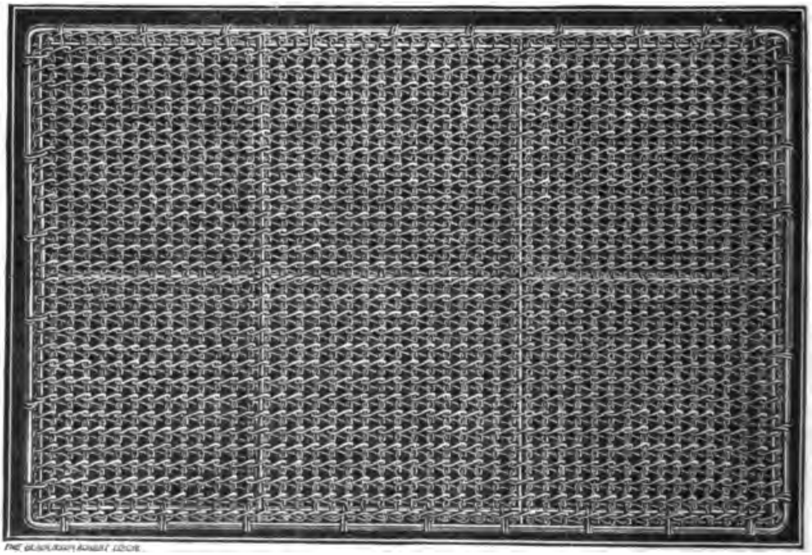


FIG. 2.

The manufacturer claims that these mats are self-cleaning and require no shaking; that they cost one third to one half less than the corrugated rubber mat of equal thickness, and are adapted for any and every place where a mat or a matting is needed, and are specially adapted for railway and street car floors, steamboats, hotels, offices, stores, residences, elevator floors, etc. They are made of six standard sizes, from sixteen inches by twenty-four inches to thirty-six inches by forty-eight inches, special sizes and shapes being made to order.

The Cortright Metal Roofing Company, office and factory southwest corner Broad and Race streets, Philadelphia, Pennsylvania, showed a small house covered with their metallic plates.

The following cuts illustrate some of the strong points of this system of metal plate roofing. Among the claims for this system, are the great simplicity of construction, the perfect protection from storms of all kinds, and the expansion and contraction amply provided for, all the shingles being nailed independently to the sheathing-boards, and all joints being so locked that a solid and tight roof is secured without the use of solder. The shingles being laid with the points down, the flow is always away from the joints. Another great point in the system is the fact that the shingles are laid beginning at the comb and working downward, thereby allowing the workman to scaffold always over the rough sheathing-boards, instead of over the finished work, as in all other slate, tile, or shingle roofs.

Fig. 3 shows fold and nailing-flange in ridge-coping.

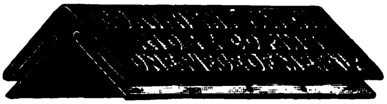
Fig. 4 shows ridge-coping in place, and shingle inserted in fold.

Fig. 5 shows manner in which the shingles are laid downward from the comb.

Fig. 6 transverse vertical section of roof, showing joints and shingles, allowing for expansion and contraction.

Fig. 7 shows the manner of locking the shingle to the Cortright valley.

The latest improvements in this system are covered by patents dated June 15, 1886.



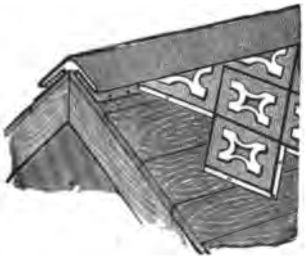


FIG. 4.

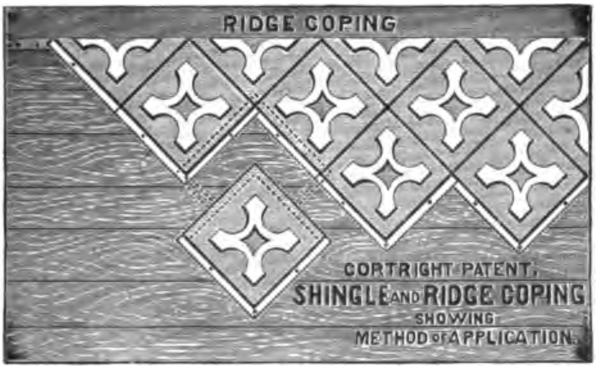


FIG. 5.

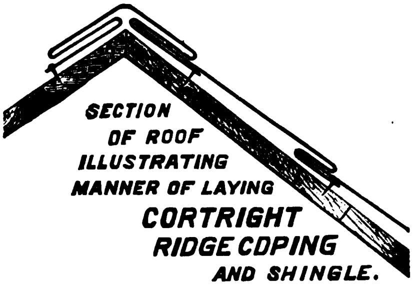


FIG. 6.

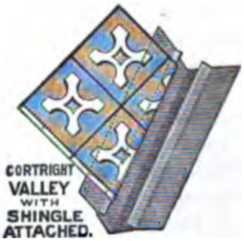


FIG. 7.

GROUP XIX—Motors and Means for Transmitting Power.

Several types of horizontal high-speed steam engines were shown, among them the Progress Engine and Machine Works, Summerfield, Maryland, showed one of their Progress automatic cut-off engines, shown in Figs. 8, 9, and 10, in operation. It was well finished and ran very smoothly and steadily.

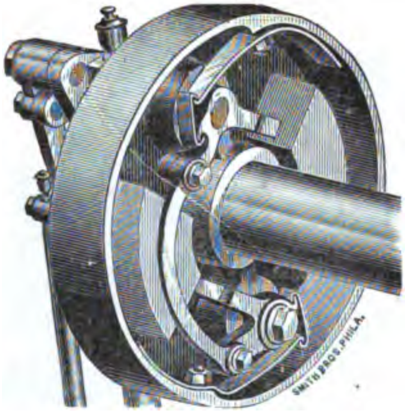

SMITH BROS. PHILA.

FIG. 9.

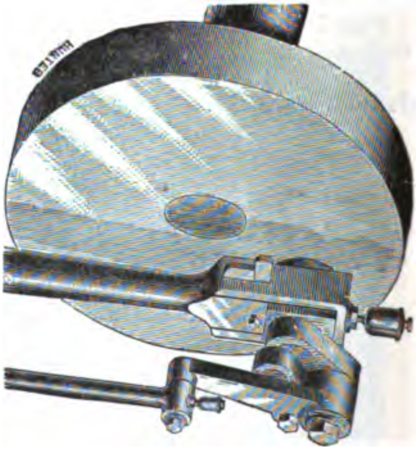


FIG. 10.

The governor is located in the crank disc, and has communication with the valve through the crank pin by means of a shaft and eccentric; the eccentric is connected to a rock-arm to which the valve rod is connected. While this governing arrangement is entirely different in construction from any other, it produces the same result as the best of those used on modern high-speed single-valve automatic engines, it weighs the load and instantly sets the valve to suit it.

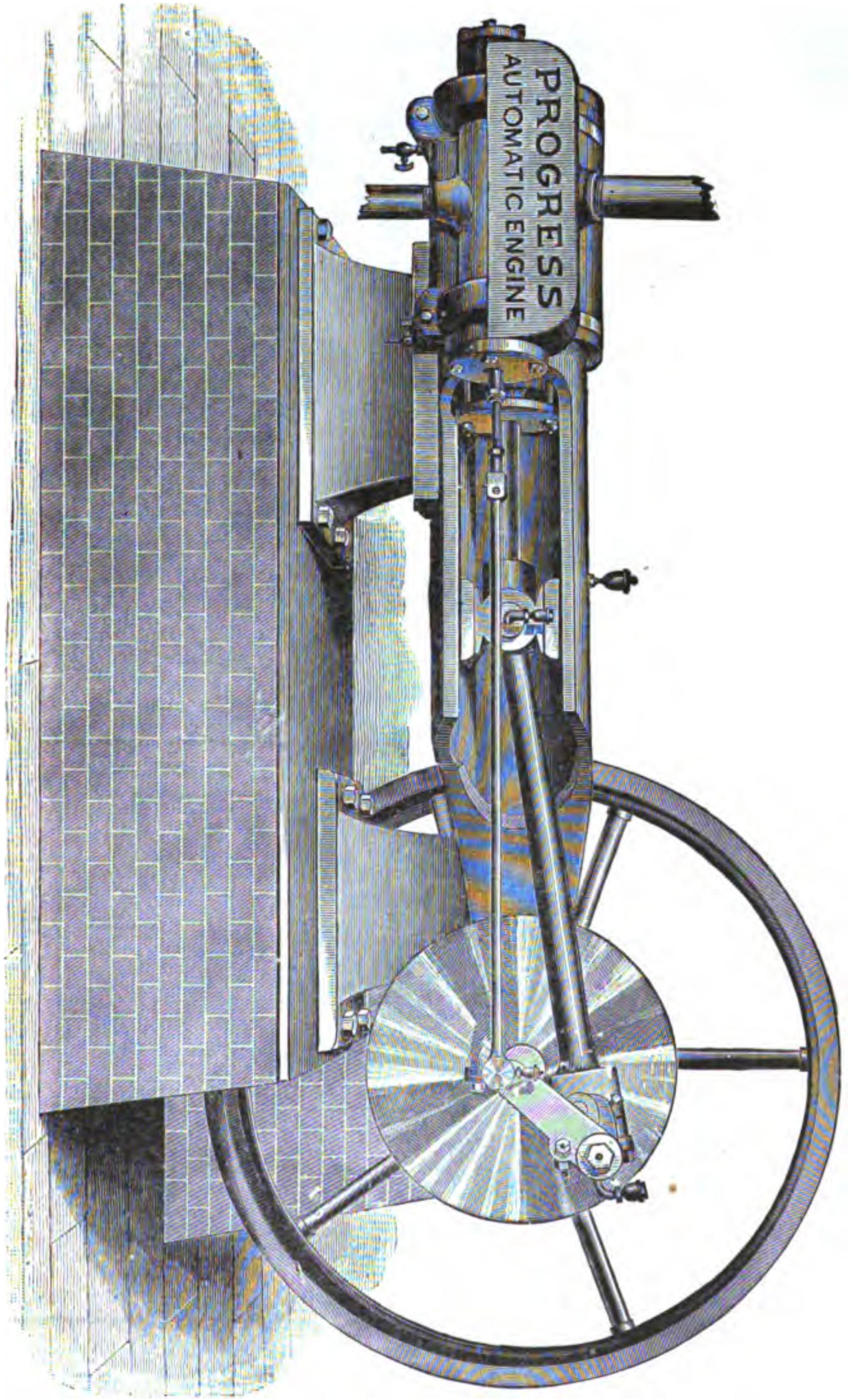


FIG. 8.

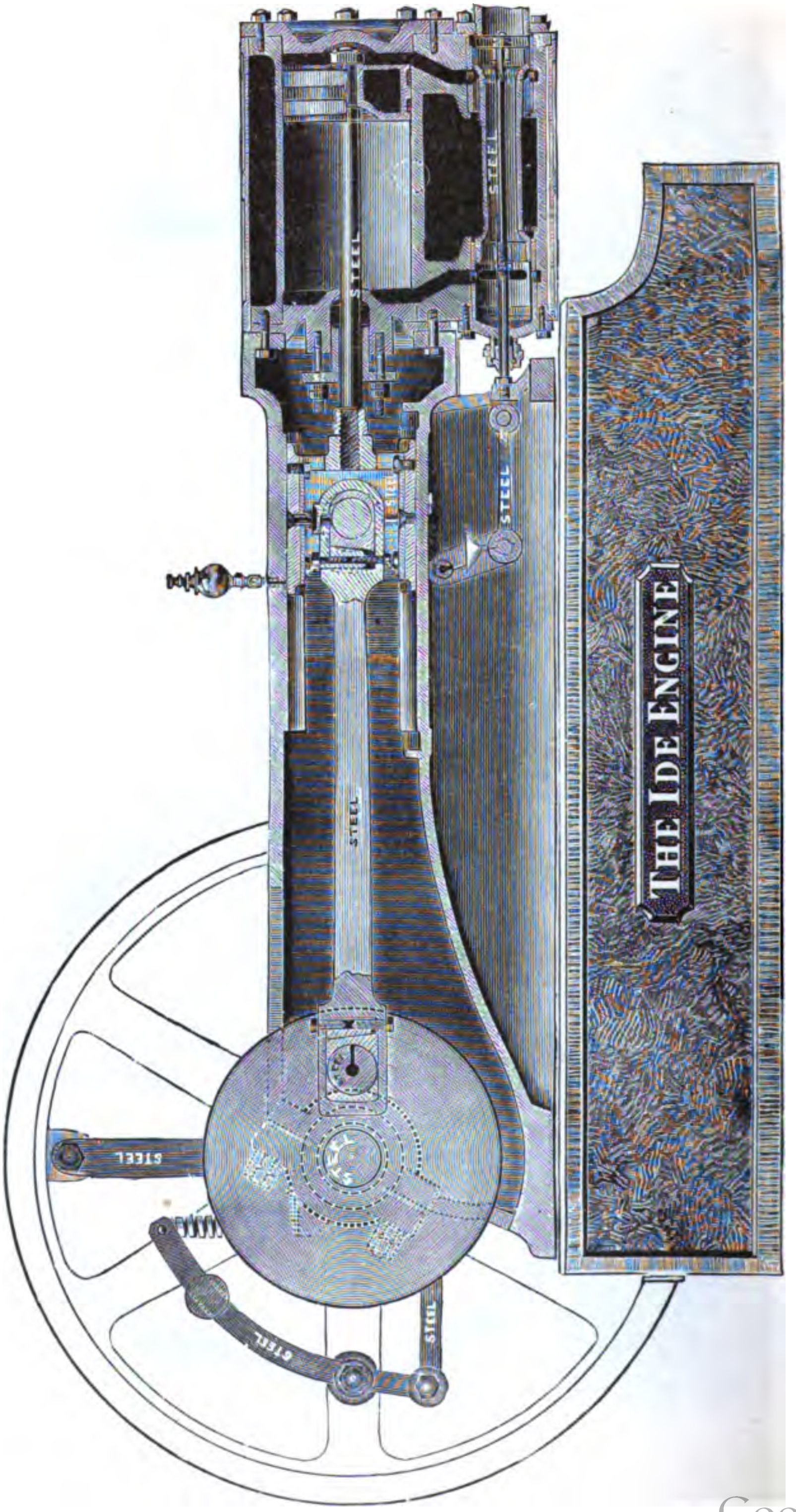


FIG. 12.—LONGITUDINAL VERTICAL SECTION.

The Foundry and Machine Department, Harrisburg Car Manufacturing Company, Harrisburg, Pa., also exhibited one of their Ide automatic cut-off engines, with their most recent improvements. It was well designed and constructed, and handsomely finished. Figs. 11, 12, and 13 will give an idea of the appearance of this engine.

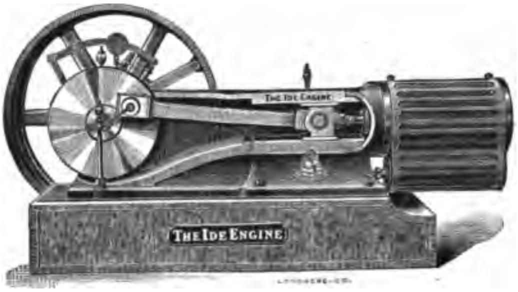


FIG. 11.—LONGITUDINAL ELEVATOR.

The automatic safety governor is shown in position in the fly-wheel, Fig. 13.

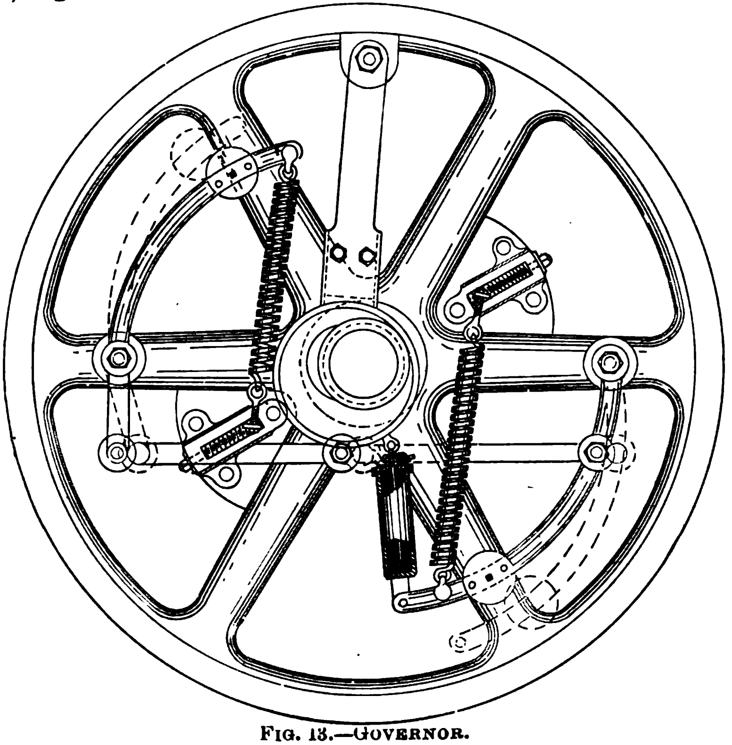


FIG. 13.—GOVERNOR.

The eccentric has a pocket projecting from the lower side to which a steel arm is bolted. This arm is pivoted near the rim of wheel. Opposite to this arm is a lug to which two steel arms are connected. These arms are connnected to two bent steel levers, on which the fly-weights are placed. As these arms move out into the position shown by the dotted lines, the eccentric is carried across the shaft.

The movement of the eccentric is obtained from the centrifugal force of the balls, which movement is controlled by the spiral springs. The speed of the engine may be changed to suit requirements by shifting the weights, or by tightening or slackening the springs. The springs hold the eccentric at a point which gives the valve full throw, until the engine is up to its speed, when the centrifugal force of the weight is greater than that of the springs, and the weights fly out, moving the eccentric into such a position that it shortens the throw of the valve, and at the same time advances the lead. The dash-pot attached to the end of one of the levers controls the movements of the weights, preventing any sudden movement or jumping of the weights when a large change of load occurs suddenly, and by its use a more sensitive adjustment of the springs and weights can be made, and a closer and more perfect regulation of speed can be obtained; it also holds the eccentric in a comparative rigid position to overcome the rapid alternating resistance in moving the valve.

When the engine is running without a load, the valve opens to admit steam at full boiler pressure exactly on the center, and closes before the piston has moved one half an inch. Steam is allowed to follow at full boiler pressure further and further as the load is increased. When the maximum load is reached, the full throw of the valve is given, and in order to keep up the speed, steam is admitted at full boiler pressure up to three fourths of the stroke. The large ports allow a very large opening to be obtained with a small travel of the valve, giving full boiler pressure in the cylinder even at such a high speed, and when steam is following over three fourths stroke. The valve will close and cut off steam at a point that will just do the work, and maintain the regular speed.

S. C. Harbert, 1907 Market street, Philadelphia, exhibited one of Wood, Taber & Morse's four driver traction engines Fig. 14, in operation.

On engines of this class, the propelling power has heretofore been applied only to the rear axle, owing to the difficulty of connecting the driving mechanism with the forward axle, which changes its lineal position when turning to travel around curves.

The objects of these improvements are to increase the efficiency of said engines in their self-propelling operation, and to obtain better control of the guiding of the same, and consist essentially in the combination with the forward or steering truck, of a counter shaft having a flexible joint, to allow one end thereof to accommodate itself to the oscillations of the axle. This combination, in connection with a semi-spherical step on axle, and with compensating gears to furnish the drivers differential movements, enables them to provide the first road engine which has the power practically and efficiently applied to the four drivers simultaneously, and while so applied, each driver pulls in traveling either forward or backward, in straight line or on curve, entirely independently of either of the other drivers.

The entire weight of the engine and boiler is in this manner made useful to the traction power, and the traction power is made most efficient by being distributed upon four drivers.

The result is to increase the traction power because the forward drivers assist proportionately to the load upon them, instead of being an obstruction to be pushed along.

The result of loading the forward drivers is also of the utmost value in securing positive control and ease in steering on loose, stony, slippery, uneven, and otherwise difficult ground to travel.

The traction attachments take power by a friction wheel applied by clutch, and rod and hand wheel, at pleasure of the engineer, to inside rim of the fly wheel, and the friction wheel has a pinion attached to its hub, from which pinion power is conveyed by train of gears, and through compensating gears to the rear axle.

As a traction engine, this engine has the peculiar and decided advantage over others in being free from the liability of being caught on the center, and is at all times entirely at the control of the engineer; it can be moved instantaneously forward or backward. The improvements are secured by patents dated March 11, 1884, October 27, 1885, January 19, 1886, May 11, 1886.

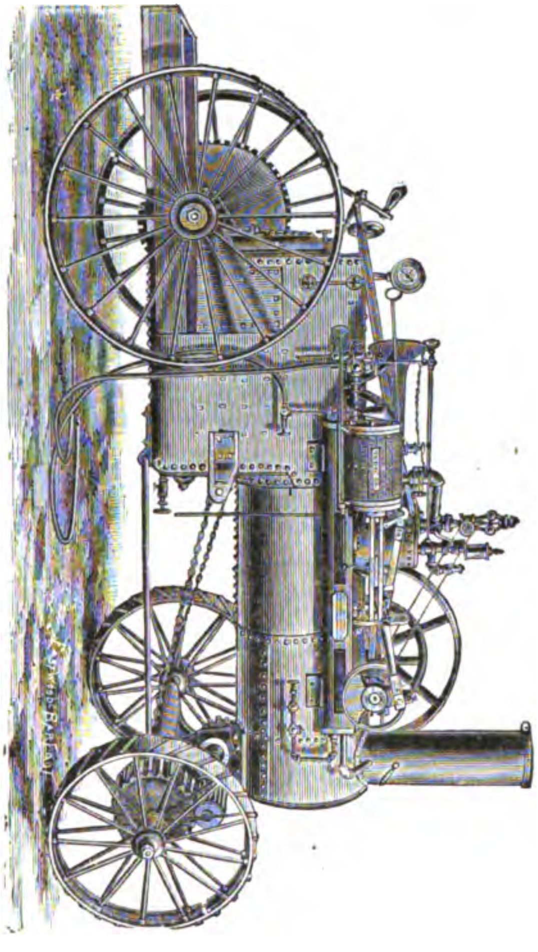


FIG. 14.

The Shipman automatic oil-burning steam Engine, Rochester model, exhibited by C. D. Young & Bros., 42 North Fourth street, Philadelphia, attracted much attention, being shown in operation, and they claim that their recent improvements render the boiler and engine absolutely safe against explosion, and well adapted to light manufacturing purposes, steam yachts, &c., the engines being now made from one to five horse-power, with boiler and engine combined.

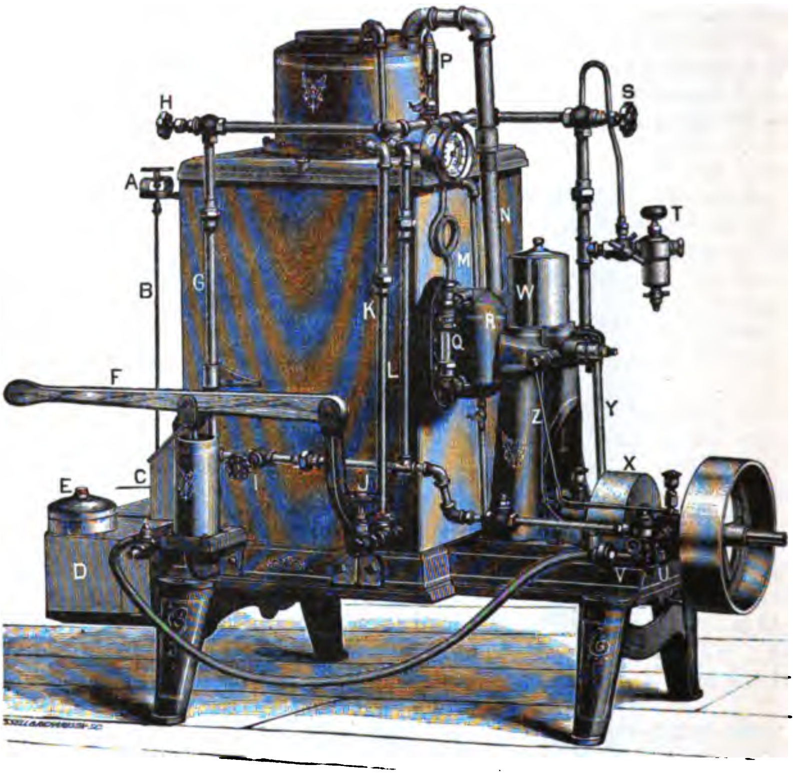


FIG. 15.

Fig. 15 represents both the one and two horse-power Rochester Model Shipman Engine.

A. Diaphragm. *B*. Pipe connecting Diaphragm to Atomizer.
C. Atomizer. *D*. Oil tank.
E. Lamp or torch. *F*. Air-pump handle.
G. Pipe connecting air-pump to the boiler. *J*. Blow-off valve.
K. The drain-pipe from exhaust steam heater.
L. The pipe connecting feed-water pump to the heater.
M. Drip-pipe from the exhaust steam heater.
N. Exhaust steam-pipe. *O*. Steam-gauge.
P. Pop or safety valve. *Q*. Water glass. *R*. Float chamber.
S. Throttle-valve. *T*. Swift sight-feed lubricator to the cylinders.
U. Feed-water pump. *V*. Strainer to feed-water pump.
W. Brass cylinder cap. *X*. Shield to the governor.
Y. Steam-valve eccentric connecting to the governor.
Z. The perpendicular rod operated by float in float-chamber to cut off the supply of water to the feed-water pump.

The boiler is sectional, with tubes screwed into the back. Each tube is tested before use to four hundred pounds pressure to the square inch, and the boiler, when completed, is also tested to the same pressure.

A pop or safety valve is attached to the boiler, of the same principle as that used upon locomotives.

A coil-pipe heater delivers water into the boiler at a temperature of one hundred and eighty degrees or more. The water supply is regulated by a float in the float chamber, connected with valve at the pump, which opens and closes automatically, and thus keeps a uniform supply of water in the boiler.

The fuel is kerosene. Quality, one hundred and ten or one hundred and fifteen test. Cost by the barrel, about, seven and one half cents per gallon. By the use of kerosene as fuel, small amount of storage room is required, and the services of a fireman, and the dirt from coal or wood are avoided.

The fire is formed by the pressure of steam flowing through an atomizer, which throws the kerosene in a very fine spray into the firebox. This causes an intense blast of fire. In this way the oil is consumed without the agency of wicks. The combustion of the fuel is so perfect that there is little or no smoke, and the full value of the heating qualities of the fuel is obtained.

The diaphragm is constructed especially for this engine. It controls the fire so that any given pressure of steam can be carried at all times.

The oil tank holds about two gallons. This tank has a water space between the oil and the fire-box, and this space is filled with water from the feed-water supply, and thence pumped into the boiler. In this way there is a constantly changing jacket of water three fourths of an inch thick in front of the oil, thus making it impossible to heat it.

The pump is made of brass in regular engine-pump form, with lift and force valves; the plunger is connected to the main shaft by an eccentric, and is constantly working when the engine is in motion, and, in connection with the water regulator, keeps a uniform supply of water in the boiler.

An automatic governor on the shaft increases or decreases the opening of the steam ports, and thus keeps a uniform speed of the engine with a varying load.

The cylinders are kept lubricated with a self-oiler. The shafts have oil cups. The connecting rods are automatically oiled.

The wrist pins are hardened steel. The piston has packing rings, and all parts are provided with means of adjustment for wear.

McGahan's patent lightning boiler tube and flue cleaner, manufactured by the United Manufacturing Company, 49 South Front street, Philadelphia, Pa.

Among recent inventions shown in operation, we find this simple, automatic, mechanical device. The cleaner connections to the boiler, where good, live steam is obtainable, are all of iron pipes, connected by patent adjustable folding brass joints, permitting a free and easy movement of the cleaner in all directions, thereby avoiding the use of hose, which is liable to wear out, burst, and scald the operator. The cleaner is durable in all its parts.

The merit of this cleaner lies largely in the automatic jet-head, the steam pressure keeping same closed, until, on pressing it against the end of each tube, we have a sudden blast of four jets of live steam, quick and effective, equal to the explosion of powder in a gun, and carrying soot and scales before it. A quick, sudden blast is claimed to be much more effective than a steady flow of steam.

The steam being shut off the instant the pressure is removed, in changing from tube to tube, none is wasted, and no soot and dirt are blown back into the operator's face. The operation on each tube is so quick and perfect that no condensation of steam is made to dampen and cake the soot.

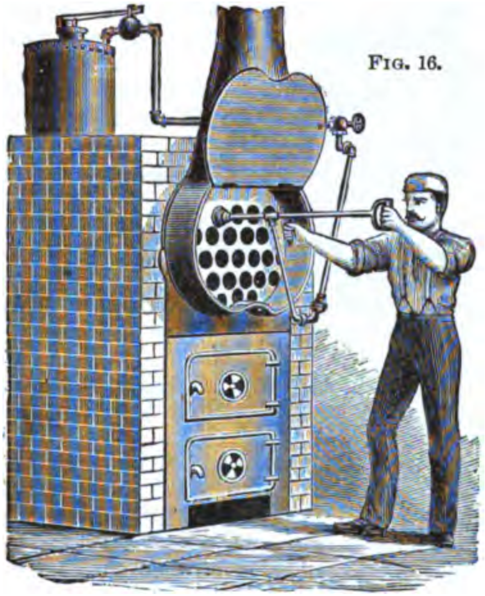


FIG. 16.

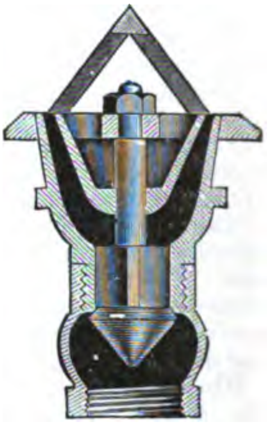


FIG. 17.

Sectional view of the automatic jet-head. Fig. 17 is a sectional view of automatic jet-head, showing two interior compartments connected by a passage which is closed by a sliding valve, to which is attached the conical guide-plate.

Fig. 16 shows the cleaner as connected to a boiler with their patent folding pipe joints, these joints permitting the movement of the cleaner in any direction.

The same company also exhibited McGahan's swivel pipe union for connecting sprinkling hose to the water-supply pipe. See Fig. 18.

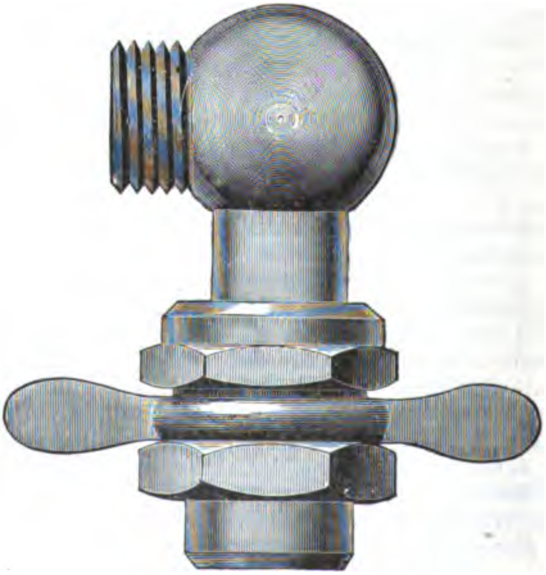


FIG. 18.

It is claimed that it saves the hose by preventing it from breaking at point of connection; that its movable parts work free and easy, and that it can be connected or disconnected in a moment without the use of a wrench.

GROUP XX—Pumps and Blowers.

The Philadelphia Exhaust Ventilator Company, 121 North Fourth street, Philadelphia, exhibited several styles of the Amherst water motors, a piston motor in which important improvements have been made during the past few months. The sizes regularly made run from one eighth to eight horse-power, for running sewing machines, dental engines, printing presses, organ blowing, &c., larger sizes for special purposes being made to order. Fig. 19 shows a front view, Fig. 20 a side view, and Fig. 21 the different parts of the No. 1 and No. 8 motors and the balance governor valve for organ blowing. *A* represents the cylinders, *B* the valve and shaft, *c* the piston, and *H* the ring connecting the pistons to the crank, all of the No. 8 motor. *d* represents the cylinders, *e* the valve and shaft, and *f* the piston, of the No. 1 motor. *G* is the balance governor valve for organ blowing.

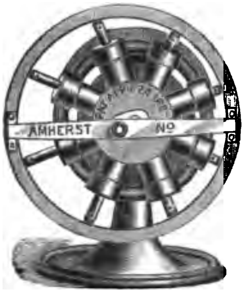


FIG. 19.

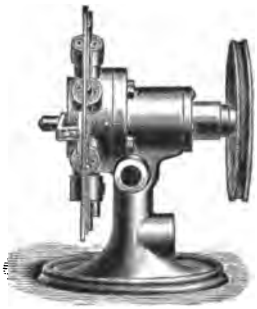


FIG. 20.

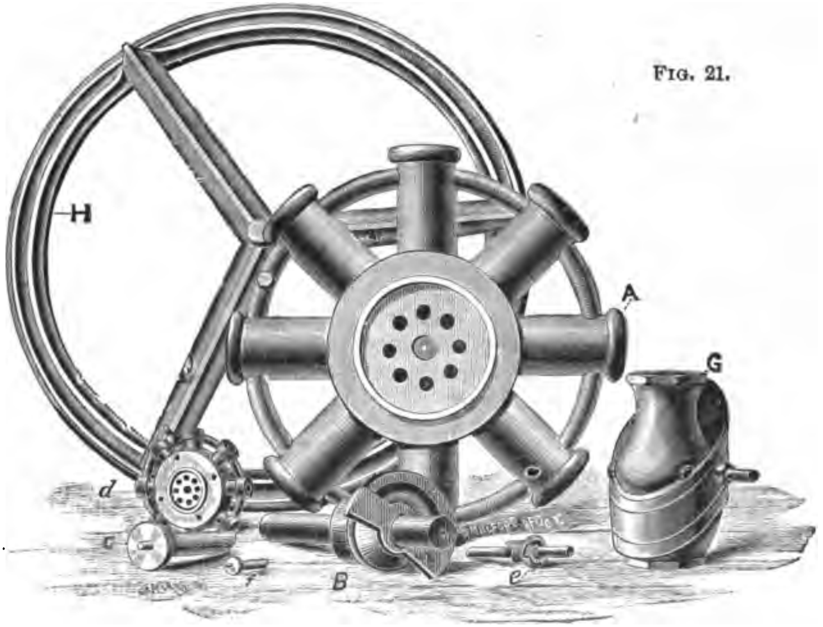


FIG. 21.

Eight cylinders, radiating from a common center, with corresponding pistons and rods, constitute the principal working parts of the motor.

By means of a single rotary valve, the water is admitted to four of the cylinders. These, being single acting, continually shut off and admit the water in the direction of rotation, thereby keeping four cylinders constantly at work in a line at right angles to the crank. Frictionless bearings connect the ends of the piston rods to the ring which surrounds them. Through this ring power is transmitted to the crank shaft.

The ring serves the double purpose of receiving and transmitting the power from the pistons on the pressure side and of returning the pistons to their places on the exhaust side.

The power is constantly communicated to the crank-pin in a direction at right angles with the crank, thus avoiding all dead centers.

By attaching a register, it becomes a water meter, and records the amount of water passing through it.

GROUP XXI—Working Wood and Metal.

The displays of wood-working machinery made by two of our manufacturers attracted very much attention, the band saws being shown in operation.

E. & T. GLEASON, north-west corner American street and Susquehanna avenue, Philadelphia, showed their latest improved *band saw*, (Fig. 22,) having a ring guide adapted to the finest blade, as well as the widest, giving the blade the same support on the back and sides. The *swivel box* on bottom shaft, as well as on the top shaft, enables the operator to run the blade on any part of the wheel without injury to the rubber covering on the wheel.

Their new *jointing machine* (Fig. 23) has *both* tables adjustable by hand-wheel; has an independent movement on the tables to maintain parallelism between cutter-head and tables; has an adjusting screw on front table for the purpose of making hollow or straight joints.

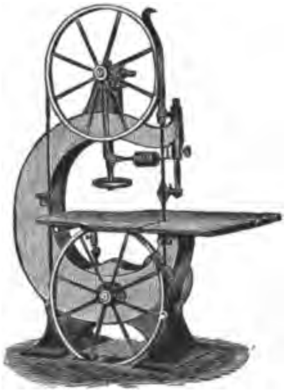


FIG. 22.

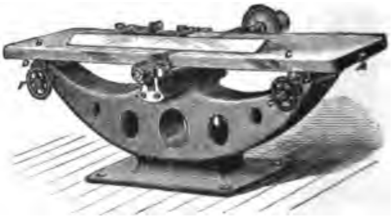


FIG. 23.

In their *improved pony planer*, (Fig. 24,) the improvement consists in raising and lowering the bed by means of a worm and large screw under the bed, the screw having a diameter equal to the length of the rolls or cutter-head, thus giving a good support to the bed.

GOODELL & WATERS, 3103 Chestnut street, Philadelphia, showed two of their improved band saws, with wheels on their improved "bicycle" plan, having double spokes with glued-up wooden rims, the sections breaking joints and covered with pure gum. They are also supplied with a patent compensating weight and rubber cushion to maintain a uniform tension of the saw blade. A new saw guide has also been added.

C. G. POULSON, Linwood, Delaware county, Pennsylvania, exhibited his patent *mower and reaper knife-grinder*, (Fig. 25,) with his latest improvements.

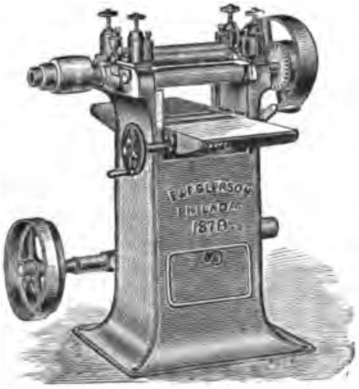


FIG. 24.

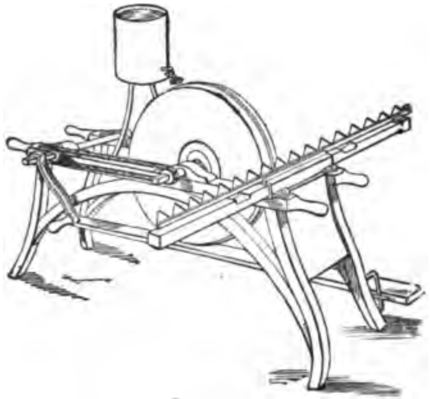


FIG. 25.

This machine is constructed as follows:

Two stones are hung on a shaft in same manner as an ordinary grindstone, except that an open space of one fourth inch is left between the two stones, which prevents all cutting of the bar on which the knives are riveted. The two stones are beveled to correspond with the bevels on the knives. The knives are placed flat on the stones, and two contiguous edges, or the equivalent of one knife, is ground at one operation. The crank is geared back out of all reach of the knives.

The following figures show the comparative cost of grinding by the two methods—the old and the new:

The inventor claims that it takes by the old process from forty-five minutes to one hour to grind a set of mower and reaper knives, and, be as careful as we may, it is impossible to do it perfectly.

On this machine it takes fifteen minutes to grind a set of knives down the first time to the shape of the stone; after the first time, it takes an average of five minutes to grind the set perfectly.

Old Process.—Grinding one hundred sets of knives at forty-five minutes each, four thousand five hundred minutes, being seventy-five hours at forty cents per hour for two men, thirty dollars.

New Process.—Grinding one set of knives first time to shape of stone, fifteen minutes.

Grinding ninety-nine sets of knives after first time, at five minutes each, four hundred and ninety-five minutes, being eight and one half hours at forty cents per hour for two men, three dollars and forty cents.

That they find the wear of the stones to be about three eighths of an inch in grinding one hundred sets of knives. At that rate of wear the stone will last many years, as they are twenty inches in diameter.

Several varieties of wire fencing were shown, as well as some machines for its manufacture in operation, that of the GAUTIER STEEL DEPARTMENT of the CAMBRIA IRON WORKS, Johnstown, Pa., being the most recent, and forming a *link barb wire*. The machine is very ingeniously constructed, each link with its barbs being formed of one piece of wire. The Cambria link barb wire is a perfect chain of galvanized wire, with barbs, the principle being a chain of steel instead of a strand of twisted wires, and the barbs are so arranged that they can be made to point all one way, so that the smooth side will be next to the field, and the cattle can rub against the wire without scratching themselves in the slightest manner; at the same time the wire is a perfect protection against interlopers from the outside. The great objection to most barb wire fences is the inability to make gates in them. The Cambria link is so constructed as to permit a gate to be made without injury to the wire (Figs. 33 and 33*a*) by simply bracing any particular post, carrying the wire to the next post, and hanging it on hooks and throwing the linked wire to one side as you would any chain, when an opening in the fence is required. Another great advantage that we notice is that it does not tangle or kink like ordinary barb wire, but pulls out straight and as easily as a watch-chain. It looks to be very easy and quick to erect, as it does not require to be pulled out by stretchers to get it straight. The Cambria Iron Company have twenty-four machines in operation at their works, each machine having a capacity of eighteen thousand yards daily. The link barb wire is reeled on spools, containing seven hundred to fifteen hundred feet respectively, and weigh about a pound to every fifteen feet, this being a handy size for transportation.

It does away with the objection that fences of this character injure cattle, as it is easily seen, and the points of barbs can be permanently arranged at any angle desired. The wonders of machinery are surely great. The following cuts show the link barb in its different processes of manufacture, Figs. 26, 27, 28, 29, 30, 31, and 32.

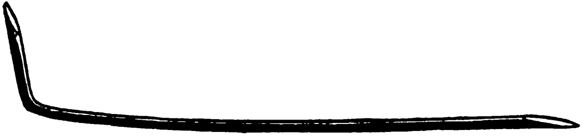


FIG. 26. FIRST FORM. ON ENTERING MACHINE.

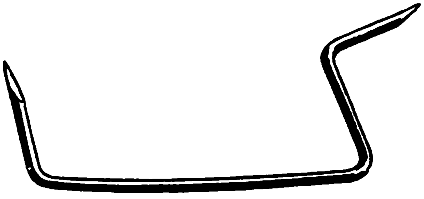


FIG. 27. SECOND FORM. BEFORE MAKING LINK.

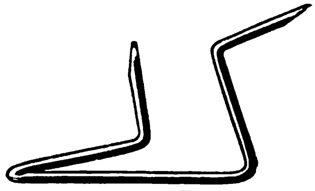


FIG. 28. THIRD FORM. LINK HALF COMPLETED.

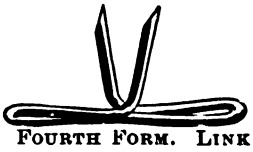


FIG. 29. FOURTH FORM. LINK COMPLETE, READY TO FORM THE BARB.

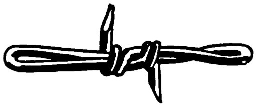


FIG. 30. FIFTH FORM. LINK AND BARB COMPLETE.

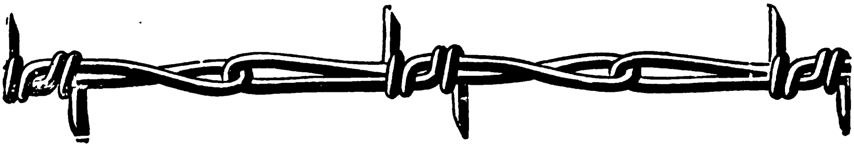


FIG. 31. THE COMPLETE CHAIN, WITH BARBS

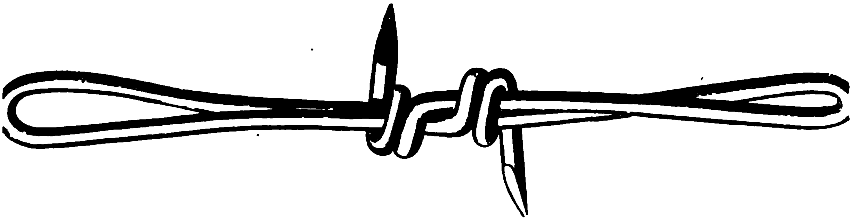


FIG. 32. LINK. FULL SIZE.

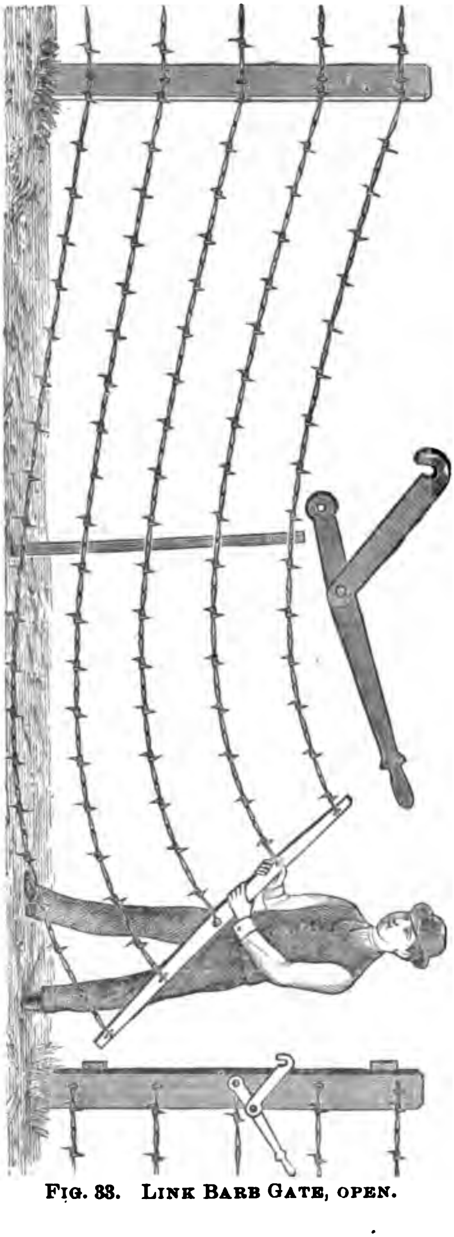


FIG. 33. LINK BARB GATE, OPEN.

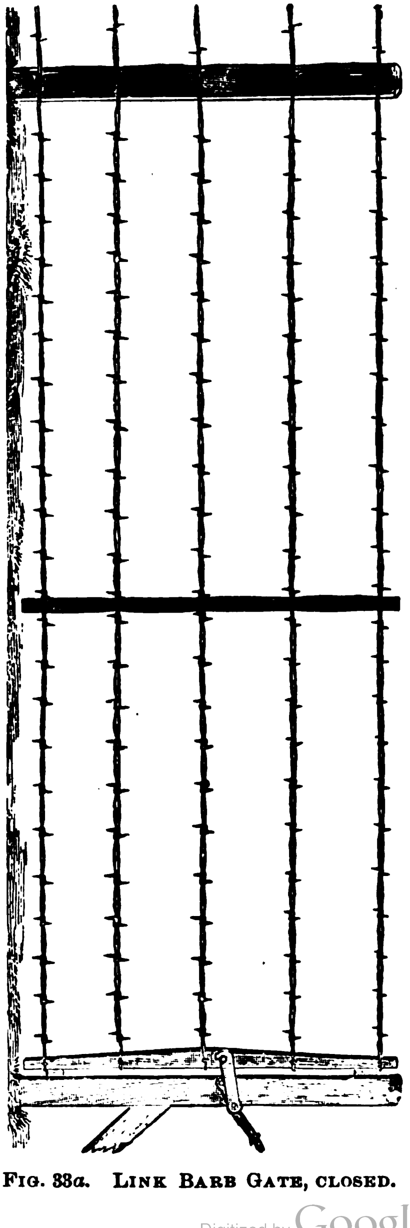


FIG. 33a. LINK BARB GATE, CLOSED.

Where the barbs are considered objectionable on the top wire, a plain twisted wire without barbs may be used.

GROUP XXIII—Leather and Textile Machinery.

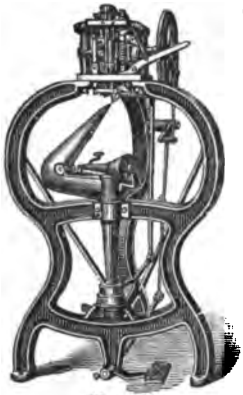


FIG. 34.

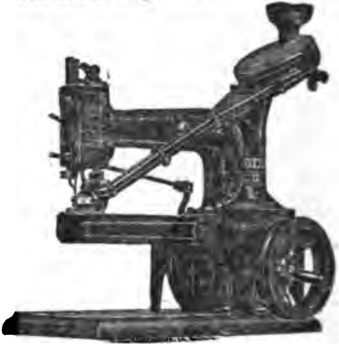


FIG. 35.

George A. Smith, No. 17 South Fourth street, Philadelphia, made an interesting display of shoe manufacturing machinery in connection with the exhibits of The Day Sewed Shoe Manufacturing Company, and Frank D. Weylman & Co., of Philadelphia. Among the machines shown was an improved McKay sole sewing machine (Fig. 34), with an improved bobbin with a continuous thread, in place of the spool formerly used. The great advance that this is will be seen from the fact that with the spool the machine could not be run higher than three hundred stitches per minute with a perfect tension, while with the bobbin and other improvements, the speed can be increased to four hundred and fifty stitches per minute, and the high speed machines can be run up to eight hundred per minute or faster, thus doubling or trebling the capacity of each man, machine, and the work done by one operator, making the improved machine specially adapted to steam power.

Mr. Smith also exhibited the Standard button-fastening machine for sewing buttons on shoes at the rate of twenty thousand buttons in ten hours more uniformly and securely than by hand, each button being fastened independently of the rest. The machine (Fig. 35) is a very ingenious one, and the recent improvements make it automatically adjustable for any size of shoe button, as well as render the feed movable, vastly increasing the efficiency ofthe machine.

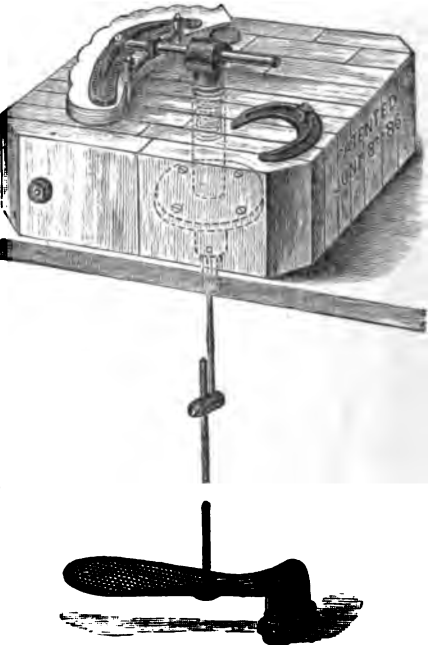


FIG. 36.

The same exhibitor also showed J. W. White's new shoe scalloping machine, Fig. 36, a very simple and ingenious machine, by which the uppers for shoes may be scalloped much more rapidly and accurately than by hand.

Wheeler & Wilson Manufacturing Company, 1312 Chestnut street, Philadelphia, exhibited their new "D. 10" machine, Fig. 37, specially adapted to the manufacture of boots, shoes, clothing, and every other kind of stitched goods, which, although of the dimensions and general appearance of their "No. 10" machine heretofore in use, is in construction and mode of action a radically new machine.

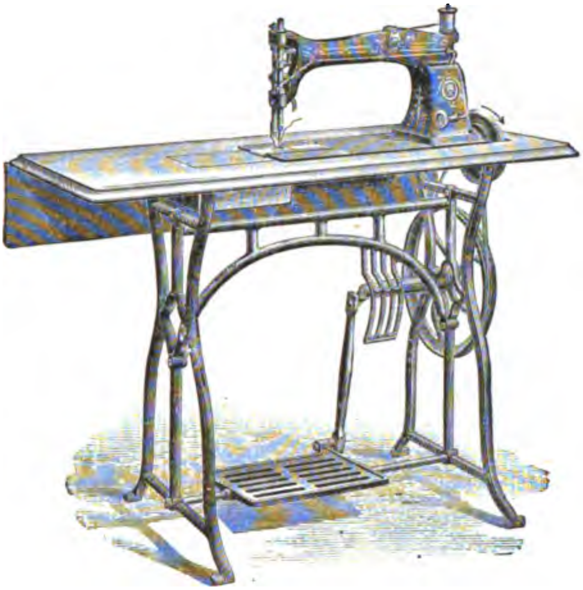


FIG. 37.—D. 10 MACHINE.

While the advantages of rotary motion are retained, the threads are interlocked by a new device whereby the upper thread is carried around the lower without meeting with any resistance.

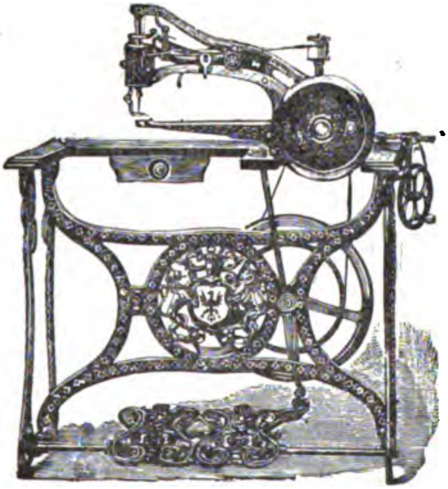


FIG. 38.

The bobbin holds over one hundred yards of No. 70 cotton, having about twice the capacity of the largest bobbin heretofore in successful use in any lock-stitch machine.

This machine handles with the utmost facility every quality of thread—cotton, silk, or linen—on every kind of stitchable material.

It uses a short needle, has a positive feed, is fitted with either the drop (four motion) feed or the wheel feed, as may be required, and is furnished to order with seam trimmer, blind stitch attachment, and other appliances for special work.

The same company also exhibited the German universal feed cylinder sewing machine, Fig. 38. The thread passes through the center of the needle bar, and the arm is so small that you can sew a patch on any part of a child's shoe, as it feeds in any direction.

New elastics can be put in old shoes, leather patches on cloth or woolen mittens or gloves, and a variety of work done.

The same machine is also constructed with an automatic device, an improvement which once set allows the duplicating in any number of patterns of circular stitching, such as is used in box-toe and similar work.

These machines were shown in connection with the shoe manufacturing exhibit of Frank D. Weylman & Co., Philadelphia.

DEPARTMENT V—Manufactures—General.

GROUP XXVIII.—Skins, Horns, and Feathers, and their Manufactures.

The Day Sewed Shoe Manufacturing Company, W. W. Apsley, manager, 23 North Eighth street, Philadelphia, made an exhibit of great interest. In the space set apart for it, the whole process of making shoes by this new and improved method was carried on in the presence of the public.

The Day sewed shoe is the result of several years' invention. Mr. George W. Day, of Haverhill, Massachusetts, was the originator of the idea, and he has matured it by long and careful study, many experiments, and the experience which comes from many failures brought to successful issues. A few months ago, the Day Sewed Shoe Manufacturing Company, organized in Philadelphia by a Philadelphian, and consisting mainly of well-known citizens of Philadelphia, opened a store at No. 23 North Eighth street, of that city, and put the shoes before the public with every facility for judging of their merits. The result has been most gratifying. The beauty, finish, and excellence of their work are beyond all question, while the comfort of the shoes, their durability, and their reasonable price daily recommend them to new wearers. The special merit of the new method is that it does away with the use of the welt, long considered indispensable in shoemaking, and only to be avoided by this process. The welt, required in the old method, separated the inner and outer sole at the edge, leaving a space which must be filled with some foreign substance. In the best shoes, this consisted of leather scraps and shreds, but it necessarily added to the stiffness and weight of the shoe, while it increased the liability of breaking out, and rendered the inside of the shoe more or less seamy or uneven. In the cheaper shoes, this filling was less carefully selected, and in the very lowest grades, it was a gather ing together of refuse scarcely more pliable than chips, and about as durable as coarse brown paper. The inside of these old-fashioned shoes was always a little rough under the lining, while some of them were a perfect hot-bed of torture from tacks, nails, knots, or wax-threads, and hard, rough seams. As the lining wore away or curled up from the heat of the foot, these discomforts increased, and hundreds can testify to years of suffering from such a cause. In the Day sewed shoe this is all done away with. The sole is split along the edge, turned back, and sewed. Then the split piece is drawn carefully together over the stitches, and firmly secured by a cement which remains unaffected by the heat of the foot or dampness. There is no filling, of course, and the inside of the shoe is as smooth as glass, unmarred by a seam, and it remains so until the shoe is entirely worn out. Machine-sewed as it is, there is no doubt that it equals any hand-sewed shoe.

FIG. 39.

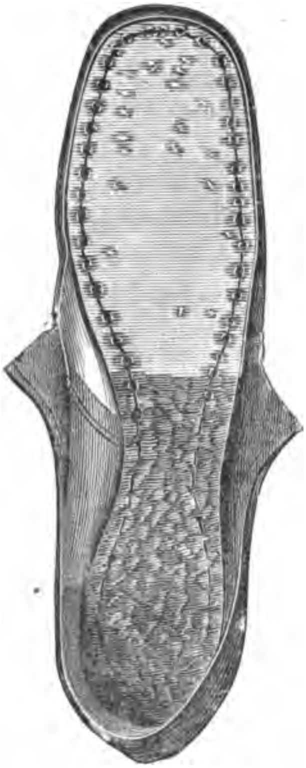


FIG. 40.

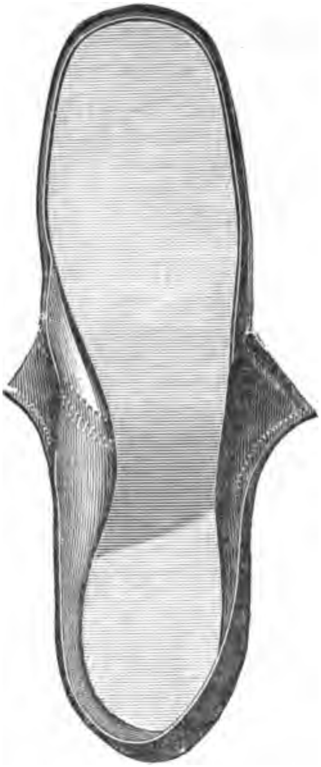


Fig. 39 shows the inside of the old sewed boots and shoes. Full of tacks, nails, and threads. Fig. 40, inside of the new Day sewed boots and shoes. No tacks, nails, or waxthreads, easy and comfortable to the feet, equal to custom-made.

The special machinery used in the manufacture of the Day sewed shoe is of recent date, the Day insole channeling machine having been patented in September, 1885, and introduced within the past few months.

GROUP XXX—Paints, Drugs, Chemicals, and Spices.

The Weikel & Smith Spice Company, No. 133 North Front street, Philadelphia, exhibited a large and varied assortment of very fine and valuable spices, both in their natural condition and conveniently prepared for family use. The collection comprised samples from the islands of Ceylon, Sumatra, and various other spice countries, and showed much taste and ingenuity in their arrangement. It also included a display of Lemberger's American oil polish paste blacking.

They also showed in operation Smyser's new automatic package-making and filling machine, the only machine of the kind on exhibition. It accomplishes as much work as eight expert packers, neater, more correct, and more uniform than can be done by human hands. It pastes, folds, weighs, fills, and closes—in fact, makes and turns out packages complete, without being touched by human hands, at the rate of about ten a minute, attracting large crowds of visitors to witness its work, making the exhibit one of the most attractive in the main building, and reflecting much credit on the firm showing it.

DEPARTMENT VI.—Home and Social Improvement.

GROUP XXXII—Household Machines.

The Wheeler & Wilson Manufacturing Company, 1312 Chestnut street, Philadelphia, showed a large number of sewing-machines for family use and manufacturing purposes, with their late improvements, driven both by foot and steam power, in their special building and on the space of Frank D. Weylman & Co., shoe manufacturers, of Philadelphia.

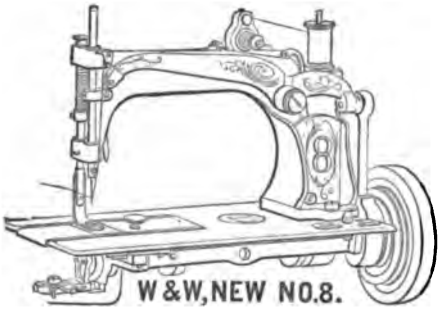


FIG. 41.

Among those deserving special mention, are the New No. 8, with automatic tension, Fig. 41, intended for family use. It is the only lock-stitch machine in which no shuttle is used.

In this machine the threads are interlocked by means of a rotary-hook which constantly revolves in one direction and obviates the shocks which are produced at every stitch by the forward and backward movement of a shuttle. The needle-bar rises and falls with a regular motion, and does not stop in its upward movement to wait for the passage of a shuttle through the loop. These regular and easy movements, in connection with the excellent materials and perfect workmanship, secure the highest degree of speed, durability, and ease of action. Figs. 42 and 43 show the bobbins.

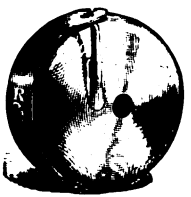


Fig. 42.

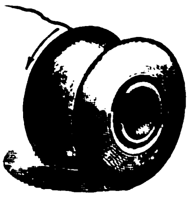


Fig. 43.

Radical improvements have just been completed, whereby it is rendered greatly superior to the recent style of machines bearing the same name.

It makes the lock-stitch which is alike on both sides of the work and does not rip or ravel, and produces a seam unrivalled for regularity, strength, and beauty. It will do all kinds of sewing, from the lightest gauze to the heaviest overcoat. If the machine be accidentally turned backward while sewing, the thread is not broken, nor is any harm done to the seam or to the machine.

The Keystone Manufacturing Company's (119 Craven street, Philadelphia, Pa.,) culinary beaters, of different sizes, were shown in operation and attracted much attention. Fig. 44 represents their No. 2 Universal Whip and Mixer.

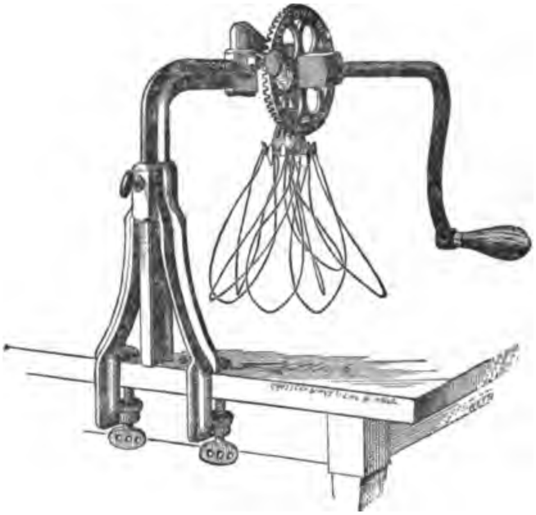


FIG. 44.

The operation of the beaters might properly be termed "a multiplied hand-method," as it simply employs a considerable number of pendant steel-spring-wire whips, and gives to them a motion from twenty to thirty times faster than the hand movement, in a vessel confining the batter. In other words, there are sixteen whips revolving at a speed of ten to twenty times per second. And each whip, being loose at its lower end, has a variety of additional movements, dependent upon the velocity of motion, and the varying resistance of the batter. The result is the greatest possible action on the batter. Added to this, the centrifugal force of the revolving whips concentrates the batter in their path near the sides of the vessel. The result is almost instantaneous mixing, and reducing to smoothness all batters, fruits, vegetables, &c.

But in the egg beater even greater action is obtained. An angular vessel is employed, by means of which the flow of the egg, or other liquid, is checked, while the whips dash forward through it. The angles or corrugations of the vessel communicate an additional irregular churning movement to the whips. It will be readily seen why the Keystone egg beater whips an egg stiff in one fourth of a minute.

The machine is readily cleaned after use, and may be used as an egg beater, fruit whip, churn, universal mixer, potato masher or whip, cake beater, vegetable whip, cream whip, vegetable defibrinator, culinary creamer.

GROUP XXXIII—Heating, Cooking, Ventilating, and Lighting.

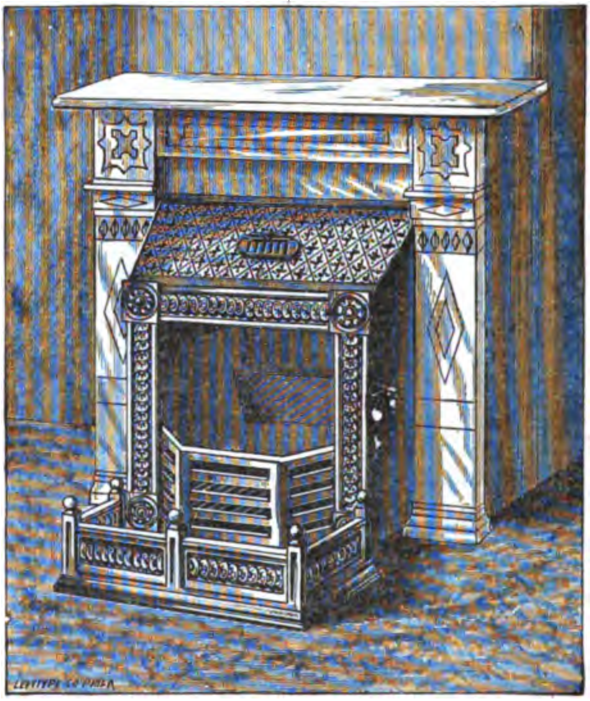


FIG. 45.

The Philadelphia Exhaust Ventilator Company, 121 North Fourth street, Philadelphia, also exhibited in operation Patton's patent hot water grate, a new apparatus heating several rooms with one fire, shown in Fig. 45, as a cheap method of heating with hot water. The apparatus represented above is an open or low-down grate, finished in different styles, for all grades of houses; is placed in the dining-room or parlor finished in plain, bronze, or nickel-plated front, different patterns, to set flush with the wall or against it. When the apparatus sets out from the wall, we get greater heat, thereby heating a greater space than ordinary low-down grates.

The apparatus represented above is a hollow casting on the sides, top, and back; as the hollow space is not large, the water is soon heated when the circulation begins. In setting the apparatus, two pipes are led from the casting to the rooms to be heated, through the flue to the radiator or coil of pipe, connecting them with wrought-iron pipes at the top and bottom, making a complete circulation of water as soon as the water in the apparatus is heated, which, being lighter than cold water, ascends through the pipe to the radiator, and maintains the circulation long after the fire is out. The moment the water gets cool, it returns to the bottom of the apparatus to be heated over again. Steam cannot be generated in the apparatus, as a small tank is placed at the highest point connecting with the return pipe.

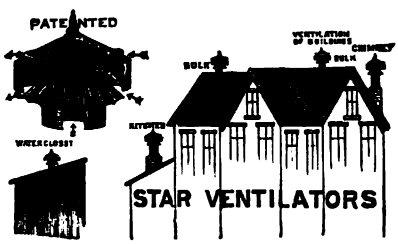


FIG. 46.

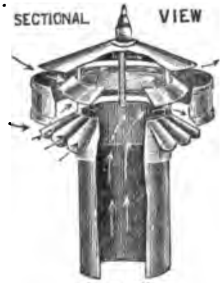


FIG. 47.

Star Ventilating Company, 6, 8, 10, and 12 Fetter Lane, Philadelphia, exhibited a number of their improved Star ventilators of different sizes for ventilation of churches, schools, factories, stables, residences, kitchens, bulks, bath-rooms, water-closets, out-buildings. They are well designed and constructed, and from experiments made with a small one, seem well adapted to the purpose for which they are designed. They are represented in elevation in Fig. 46, and in transverse section in Fig. 47, which convey a good idea of their construction and use.

GROUP XXXVI—Education and Natural Science.

The Polygraph, exhibited by the Polygraph Company, E. M. Goldsmith & Co., proprietors, Sixth and Arch streets, Philadelphia, is a new and ingenious invention, shown in Fig. 49, which also shows the mode of using it. By its aid drawings can be produced which formerly required long months of study and preparation. At the same time its accuracy and convenience render it of much practical use, as it combines in itself the qualities of straight and curved rules, dividers, protractor and scale, besides other auxiliary figures which enable one to produce many results, which could hitherto only be brought about by the use of complicated instruments. Its greatest advantage is the phenomenally short time in which designs may be drawn, thus suggesting and encouraging ideas of art. After following the intricate rules for constructing regular polygons of three, four, five, six, eight, ten, and twelve sides, the student finds great difficulty in obtaining correct results, while with the polygraph they can be accurately made, and in an incredibly short space of time.

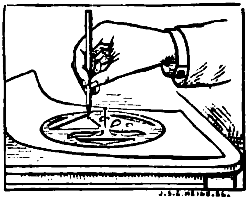


FIG. 49.

The American Machine Company, north-east corner Lehigh avenue and American street, Philadelphia, made a large and interesting display of their hardware specialties, among them the new "Perfection Scales," a very ingenious and convenient invention, dispensing with the use of movable weights, and made in a large number of different styles, one of which is seen in Fig. 50, showing the arrangement of the self-acting weights. 1, 2, 3, etc., are the weights suspended on a bracket and held one above another, with regular intervals of space between them, and

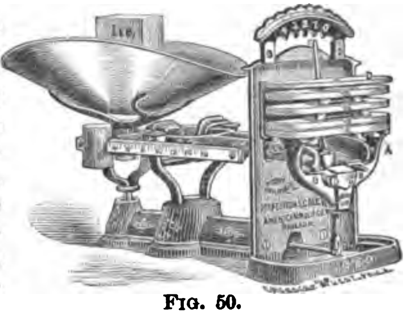


FIG. 50.

just above and in position to be acted upon by the weight jack, B B, resting on the lever pivots. The arrangement is such that, as goods are placed in the scoop the lever will turn, first raising the bottom weight off its seat, A, and then adding the others, one after another, until the lever turns sufficiently to raise them all off their seats on the bracket, when they will be resting on the lever.

The index finger is so arranged that it will move from one figure on the dial to the next just at the precise time such weight is balanced with goods and raised.

Thus, in the cut one pound placed in the scoop just raises weight 1 off its seat, A, and moves the index finger slowly up to figure 1 on the dial. Should another pound now be added to the scoop, it would raise weight 2, with the first, and bring the index finger to the figure 2 on the dial, and so on.

In use, exact weight is when the index finger moves very slowly up to the figure on the dial representing the weight required. It stands still before and after weight is obtained.

Intermediate or fractional weights are determined on the brass beam.

The hood, D, completely covers the weights, securing them in their position and also protecting them from dirt, etc.

Another form is the "Automatic Perfection Postal Scale," shown in Fig. 51, and designed to facilitate the weighing of mail matter of all classes. It is provided with a series of small automatic weights, and when letters or small packages are placed on the scale, the pointer instantly, and without vibration, indicates the weight on which postage must be paid, always including the fractional part of a unit as a full unit.

Thus, when the unit is one ounce, any parcel weighing one ounce or less will bring the pointer to the one-ounce mark; more than one and not more than two ounces, to the two-ounce mark, and so on. The one-fourth and one-half pound scale require no poise weight, the automatic weights balancing the entire capacity of scale.

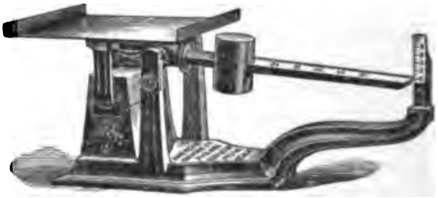


FIG. 51.

The poise weight on the beam of four pounds scale is movable only to multiples of the amount of the series of weights, and is to be used only when weighing heavy packages. Then, by moving it to the proper notch to bring the automatic weights into action, the pointer will at once indicate the additional weight of the package.

Thus, in the scale shown in the above cut, there are eight one-ounce automatic weights, which are indicated at the end of the beam, and the beam is notched at each eight ounces only. In weighing a parcel of more than thirteen ounces, and not more than fourteen ounces, the poise weight must be moved to the eight-ounce notch, when the end of the beam will at once point to the six, 8 + 6 = 14 ounces, which is the weight for postage.

GROUP XXXIX—Unclassified.

Charles Schaal, 405 North Thirteenth street, Philadelphia, exhibited a novel bedding for horses, peat moss stable bedding, imported from Germany, which is now used in Europe most extensively, the city of London alone having consumed forty thousand tons during the last year.

The exhibitor claims that peat moss deodorizes the manure and thereby produces pure air so necessary to the health of the animals, who have otherwise to inhale the obnoxious ammonia gas. It makes a soft, clean bed, and horses' feet undergo a radical change, inasmuch as they become soft where they had been hard. Horses require less grooming, owing to the cleansing properties of the peat moss. When ignited, it only smoulders and does not, by flaming up like straw, endanger the lives of horses and cattle, as well as the building. It is a disinfectant. It yields a rich fertilizer.

That, if properly used, less than five hundred pounds will suffice for one horse per year; that its lastingqualities alone make it worth double the price of rye straw, and that horses lying or rolling in peat moss will turn out bright and clean.

Directions for Use.

Put the peat moss into the stalls in small lumps, they will soon break up.

Make a bed eight inches deep.

Remove the dung, using shovel and wooden rake.

Mix the wet and the dry daily, and you will have a spongy bed, through which the air passes freely, and the bed remains in good condition for several months.

As the peat moss soaks in all liquid, there is no necessity for sewers, and where they are they should be plugged up.

It is imported in bales of two hundred and three hundred and fifty pounds, and it might be a profitable discovery, if it could be found in this country.

HARRISBURG, PA., WEDNESDAY, *January 20, 1886.*

The Executive Committee of the Pennsylvania State Agricultural Society met pursuant to the constitution, in the office of the Society, Third and Market streets, and at half-past seven, P. M., was called to order by President WILHELM.

The following members were present: A. Wilhelm, York, York county; William M. Singerly, Philadelphia; Burnet Landreth, Bristol, Bucks county; David H. Branson, Atglen, Chester county; Wm . H. Holstein, Bridgeport, Montgomery county; Tobias Barto, Reading, Berks county; Daniel H. Neiman, Easton, Northampton county; Ira Tripp, Scranton, Luzerne county; J. S. Keller, Orwigsburg, Schuylkill county; Gabriel Hiester, Estherton, Dauphin county; L. A. Mackey, Lock Haven, Clinton county; W. W. Speer, Pittsburgh, Allegheny county; J. S. McKean, Pittsburgh, Allegheny county; J. D. Kirkpatrick, North Liberty, Mercer county; John H. Ziegler, Harrisburg, Dauphin county; Jefferson Shaner, West Chester, Chester county; David Taggart, Northumberland, Northumberland county; James Miles, Girard, Erie county; D. W. Seiler, Harrisburg, Dauphin county; Elbridge McConkey, Harrisburg, Dauphin county; Alfred L. Kennedy, Philadelphia.

Letters from Vice Presidents McDowell and Blight were read, regretting their inability to be present.

The minutes of the previous meeting were read and approved.

The Committee on Legislation reported as follows:

Your Committee on Legislation respectfully reports that in obedience to the resolution adopted by the Executive Committee in January last, a bill in request for an appropriation of ten thousand dollars to relieve the Society on account of extraordinary expenses incurred in the erection of proper buildings upon their grounds in the city of Philadelphia, report as follows:

That such bill was introduced as mentioned, and that, upon the explanation made by the chairman of the Committee on Appropriations relative to the revenues of the Commonwealth, the request was modified to the sum of six thousand dollars, which was agreed upon upon the part of your committee, and that through the united efforts of the several members of the Executive Committee, the same was passed by more than a two-thirds vote in both branches of the Legislature, but failed to become a law by the refusal of Executive sanction.

Mr. BRANSON then presented his report on cereals.

The Committee on Resolutions, relative to the death of Mr. Bissell, made report through Dr. Kennedy, as follows:

WHEREAS, By the decease of WILLIAM S. BISSELL, who was the official President of the Society from 1879 to 1881, inclusive, it has lost an active and zealous fellow-member, and a member of the Exeutive Committee; therefore,

Be it resolved, That the Society hereby places on record the expression of its high appreciation of the character and services of ex-President Bissell; of his successful administration of the trusts reposed in him during a most arduous and most successful period of the operations of the Society; of the urbane and courteous manner in which he presided over its deliberations, and of the warm-heartedness which made for him and the Society hosts of friends among visitors, exhibitors, and the community in which the exhibitions were held.

Resolved, That the above preamble and resolution be printed in the transactions of the Society, and a minute be sent to the bereaved family of the deceased.

Mr. SPEER moved that the resolutions be adopted by a rising vote, which was unanimously agreed to.

The report of President Wilhelm was read, as follows:

HARRISBURG, PA., *January 19, 1886.*

To the Executive Committee and Members of the Pennsylvania State Agricultural Society:

GENTLEMEN: Before retiring from the presidency of your Society, I deem it eminently proper to submit a brief summary of the operations of your Society for last year, ending this date.

At your last annual meeting, a resolution was adopted that in future the exhibits be divided into three divisions, viz: Soil products, agricultural machinery, products of herd and stock; second, live stock; third, manufacturers not agricultural.

Also, that the President appoint a committee of arrangements, with full power to act in all matters relating to the interests of your Society, whereupon the following-named gentlemen were appointed by the President: Messrs. George Blight, L. Henry Twaddell, Burnet Landreth, Joseph A. Paxson, and A. L. Kennedy, of Philadelphia; Jefferson Shaner, of West Chester; D. W. Seiler, Recording Secretary, and Elbridge McConkey, Corresponding Secretary, of Harrisburg, and the President, *ex-officio*, as member of said committee of arrangements.

Your committee held upwards of twenty meetings in the city of Philadelphia, to promote the best interests of your Society. Deeming it necessary that such preparations should be made as would do honor to your Society and be commensurate with the magnitude and importance of the second city in the Union, where the fair was to be held, they directed that all the arrangements should be made on such liberal a scale as would be consistent with prudence and economy. Besides, about an equal number of informal meetings were held.

Early part of last April, the Philadelphia members of your committee suggested to turn over the use of the main building and its annexes to the Society of Arts, composed of prominent Philadelphians, who should take charge of the exhibits in that building for the sum of two thousand five hundred dollars, to be paid by your Society, with a view to enlist Philadelphia influence and secure its coöperation in bringing to our exhibition a grand display of Philadelphia industries. Finally, after much discussion, it was resolved to transfer the main building and its annexes to the Society of Arts, under an agreement dated July 2, 1885, during the term of your lease from Mr. Weightman, with the following proviso: "This agreement to be submitted to the members of the Society of the party of the first part, at its annual meeting to be held in January, A. D. 1886, and if the same be not ratified, then this agreement to be null and void, and of no effect."

It may be proper to add here that I declined to sign a lease, unless it contained the foregoing clause, believing your committee had no right to execute a lease for a term extending beyond its term of office, or if it had the right, it ought not exercise it. It will now be for you to determine whether the lease shall be continued or terminated. I wish to add, however, that throughout the discussions relative to tranferring the main building to the Society of Arts, the transfer or lease did not commend itself to my judgment, and do not think the objects sought in making the transfer were attained, and respectfully submit the agreement referred to for your consideration.

The transfer of the main building to the Society of Arts necessitated the enlargement of machinery and agricultural halls by an extension of twenty feet on each side, increasing the floor space fourteen hundred feet, making the total floor space of these two buildings thirty-three thousand five hundred feet. The enlargement of these two buildings was still insufficient to accommodate and meet the demands for space for floral and pomological exhibits. After mature deliberation, your committee decided to erect a new building, one hundred and fifty by one hundred and fifty feet, with four annexes, thirty-two by thirty-two feet each, at a cost of seven thousand nine hundred and eighty dollars. The interior arrangements are fitted up complete, which will not require additional expense for future exhibitions. On the whole, I doubt whether any kindred organization has a building to equal "Floral Hall." A prominent florist of New York city said the exhibits in this building were the finest he had ever witnessed.

In addition to the new buildings, your committee found it necessary to secure the use of a tent, seventy by one hundred and eighty feet, to shelter the larger class of agricultural machinery, such as engines, wagons, &c.; still the demand for space was in excess of the capacity of the additional buildings to accommodate.

Your buildings, in the main, are complete—roofed with corrugated iron, and a few of the minor buildings are covered with tin—the whole covering upwards of two hundred and forty thousand square feet of space.

The cost of permanent improvements during 1884 was . .	$63,749 00
" " " " " 1885 " . .	25,815 00
Making a total of	$99,564 00

To accomplish which required an immense amount of gratuitous labor on the part of your committee.

Notwithstanding the completeness of your buildings, the excellence and magnitude of the exhibits for 1885, which were admitted to far excel the displays of any previous State fair or of any agricultural society ever held in the Union, but, owing to the late date at which our fair was held, and the very unpropitious weather during its too long continuance for three weeks, as well as the want of better facilities by the railroad companies, the attendance fell far short of our anticipations, resulting in a loss of, say, $8,340 12 over receipts from all sources, to meet the current expenses of holding your fair during 1885, while the net profits from your exhibition for 1884 were $14,857 00.

The following is a summary of the liabilities of your Society, viz:

Permanent loan of the Philadelphia and Reading Railroad Company, ...	$25,000 00
Bills payable in favor of James B. Doyle, ...	12,727 93
Loan from A. Wilhelm, ...	5,000 00
Unpaid bills for permanent improvements, &c., ...	39,717 01
Total liabilities, ...	$82,444 94

We are compelled to report that your Society is at present financially embarrassed. Your committee has held various meetings at

Philadelphia, to devise means for the relief of your Society. Prominent citizens of Philadelphia have been induced to organize themselves into finance committees, representing the various trades and industries, to solicit contributions for the relief of your Society, whose efforts were attended with reasonable success, previous to the holidays, during which time operations were to be suspended, to be resumed soon after the first of January with additional committees, and it is to be hoped that a sufficient sum will be collected to liquidate the unpaid bills, and place your Society on a firm financial basis. It is of the utmost importance that this be done very soon, even if it be your pleasure to pass a resolution that each member loan to your Society a specific sum, not less than one hundred dollars, to be paid out of any surplus funds in the treasury, with interest at the rate of five per cent. per annum, and for which notes of your Society may be given, maturing October 1, 1886, with the option of the Soctety to anticipate the payment, or renew the same for one year on same terms at maturity. This would afford your Society prompt relief, which is almost imperative, and, if the present crisis be overcome, your future exhibitions will, I doubt not, be attended with abundant success, and your Society's entire debt will be liquidated within a few years, and a large sum in your treasury, at the expiration of your present lease from Mr. Weightman.

During the exhibition, there were several meetings of your Executive Committee held at the office of your Society, and, among other business, it was resolved to hold your next annual exhibition on your fair grounds at Philadelphia, commencing on Monday, September 6, and closing on Saturday, September 18, 1886, of which public notice has been given through the press.

I cannot close this report without referring to the untiring efforts of your committee of arrangements to promote the interests of your Society, and make your State fair a success and a credit to the great State of Pennsylvania.

Your Recording Secretary, Mr. D. W. Seiler, who has all the data, will, doubless, submit to you a detailed report, and I desire to call your attention particularly to his arduous duties and excessive labors, and respectfully recommend that you either elect a clerk to assist your Recording Secretary, or authorize your President to appoint one at such annual salary as you may deem right; that proper books may be kept, showing all the business transactions of your Society, which I am pleased to report is now being done.

And, in retiring from the presidency of your Society, I desire to thank you, and especially your committee of arrangements, for its kindness and uniform courtesy throughout.

Very respectfully submitted,

A. WILHELM,
President.

When, on motion, the thanks of the Society be tendered him for the very able manner he has presided over its interests, passed unanimously.

Secretary Seiler's report was read, and on motion, it was ordered to be printed in the proceedings.

A. WILHELM, *President Pennsylvania State Agricultural Society:*

As Recording Secretary of the Society, having in charge the records, reports, and statistics, I think that a brief statement should be made of the exhibition this year, giving a list of exhibits in each department, number of exhibits, and, in fact, a general summary of our exhibition.

The Executive Committee at the meeting in January, 1885, passed a resolution giving the Committee of Arrangements full power to act in all matters relating to the exhibition. This committee was composed of eight members, appointed by the President: Messrs. A. Wilhelm, President; George Blight, L. Henry Twaddell, Burnet Landreth, Joseph A. Paxson, and A. L. Kennedy, all of Philadelphia; Jefferson Shaner, of West Chester; Elbridge McConkey and D. W. Seiler, of Harrisburg.

This committee held in Philadelphia, either at the call of yourself or by motion, over twenty meetings, to perfect plans and discuss questions of the greatest importance to the future of the Society.

Recognizing the necessity of giving the best of accommodation, protection, and security to exhibitors, the imperative necessity forecast itself on us that additional buildings must be erected to increase the capacity, in order that we could meet all demands made on us by exhibitors. In this we were not mistaken, as the entry books were closed, on account of the demands for the space, one week before the time fixed in our premium list.

Early in the spring, it was suggested that an arrangement be made with a number of prominent business men of Philadelphia, who would, under the title of "Society of Arts," take charge and control of the main building and its annexes, and through their influence and exertions, would secure the coöperation of the industrial department of that city, and make a grand display of the manufacturing industries of that city and section of country.

This question was discussed fully at many of the meetings, from the high standing of the gentlemen representing the Society of Arts. Our committee finally entered into an agreement with the Society, transferring the main building and annexes to them, so that, as far as the exhibits placed therein, our Society did not in any way assist, but gave its entire attention to the other parts of the exhibition.

This transfer of the largest building and annexes obliged us to arrange for additional spaces to meet the demands made on us. After much discussion, it was resolved to enlarge the capacity of the agricultural machinery and the agricultural product halls, increasing the area by extending each side twenty feet in width, increasing the floor area of the two buildings fourteen thousand square feet. This gave the first-named building one hundred and fifty by ninety feet, equal to thirteen thousand five hundred square feet, and the second building two hundred by one hundred feet, equal to twenty thousand square feet.

This space was rapidly taken, and as no preparation was made for the display of fruit, flowers, vegetables, and seeds, the committee finally concluded to erect a new building, to be devoted to this purpose. A plan was made, submttted, and approved. A main hall being one hundred and fifty by one hundred and fifty feet with four approaches, one on each side, each thirty-two by thirty-two feet, the whole covering an area of twenty-six thousand five hundred and ninety-six square feet. This building is eighteen feet at the eaves, and sixty-five in height at center, with turrets, the top of the center one being about eighty-five feet from the ground, making the best and largest of the kind in this country.

By the erection of the building, this Society will not be obliged in the future to change the interior arrangements, which heretofore has cost us each year more than the interest on the cost of erection.

This interior arrangement is equal to taking two thousand feet long with an average of six feet wide, or would extend over three quarters of a mile in length at an average width of three feet, all of which was filled with the choicest exhibits of their kind.

In addition to these buildings, and of the increased demand, we were obliged to contract for a tent, one hundred and eighty by seventy feet, to cover the heavier agricultural machinery, engines, wagons, &c. We also secured the use of another tent, one hundred and forty by seventy feet, to furnish a place where visitors could rest in comfort and shade. In this tent we placed chairs, settees, &c., for the accommodation of visitors.

The total number of buildings, and their area, now on the grounds, are as follows:

Main building, 150×300,	45,000	
2 galleries, 75×40,	6,000	
6 annexes, 50×30,	9,000	
		60,000
Floral hall,		26,596
Agricultural machinery hall,		13,500
Manufactured agricultural product hall,		20,000
Carriage hall,		6,000
Tents,		24,000
Other buildings,		7,600
Cattle, sheep, and swine stalls,		67,500
Horse stalls,		15,000
Making a total of square feet,		240,196

All of which is covered with corrugated iron or tin.

This year's construction account was increased, which, added to last year's,	$25,566 30
	73,999 34
Making a total cost of	$99,565 64

In making all these improvements, it was our aim to place our ground in the best possible condition, giving the exhibitors and visitors ample protection and an opportunity to display their exhibits to the best advantage.

Our committee worked with all their power, and used every influence, and exerted themselves to make this exhibition superior to all others, and in this our expectations were fully realized. All admit that in all the departments there never was shown such a display.

In the display of horses, the thoroughbreds and fine-bred classes should have been better represented, while the heavy draught show was all that could have been expected.

The show of cattle was never equaled by any previous exhibition, and, with the exception of the Guernsey breed, was a full display of the very best breeds in this country.

The Devons, Holsteins, and Ayshires were more largely represented than ever, and the competition active. Also, it must be remembered that, under the rules adopted by this Society six years ago, all animals must be pedigreed, and this secures us a higher type of animals, with but few exceptions.

The swine pens (one hundred and twenty-six in number) were filled with finest animals and breeds in the country. And the sheep pens (one hundred and twenty-six in number) were also filled with every breed recognized.

On account of the length of the exhibition, (three weeks,) it was deemed advisable to exhibit the above stock from the opening day, September 23, to October 3, and in lieu of this part of the exhibition, to replace them with a display of poultry and dogs, commencing October 5.

The poultry coops were placed in the cattle pens, extending on both sides a distance of nine hundred feet, or equal to eighteen hundred feet in length; in many places they were placed on the top of each other. This exhibit was never equaled in this country, and pronounced by those who are an authority, to have been the best and largest ever given.

Number of exhibits.		*Entries.*
Horses, 37,		105
Cattle, 38,		288
Sheep, 22,		161
Swine, 13,		165
Poultry,	Chicks,	1,609
	Pheasants, ducks, and turkeys,	119
	Pigeons,	298
Dogs,		440

The bee exhibit this year, while creditable, I am sorry to say did not meet our expectations or equal that of last year.

The fishery commissioners of the State, through the active part taken by its president, John Gay, and several of its members, made a most creditable exhibition of native and California, or rainbow, trout, of different sizes and ages, the pike, perch, black bass, catfish, eels, ides, gold fish, German carp, &c.

On account of the delay in the completion of the building and the construction of tanks, this display was not ready until the second week of the exhibition, but when the tanks were filled, this proved to be one of the most attractive features of our show. Now, that it is arranged permanently, we hope the exhibit next year will surpass that of this year.

The large premiums offered in the dairy class for cheese, butter, &c., I regret to say, did not create that interest which was hoped for, and the display was the smallest ever shown, with a country surrounded by creameries filled by the best butter-making cattle, and with every expectation of having a full display. I think that the exhibits in this class were a reflection on this branch of industry and those engaged in it, and it is to be hoped that next year those engaged in this business will give us their active support and influence to secure a display which will be creditable to themselves and to this Society.

In the display of seeds, vegetables, and grain this Society must congratulate itself and those that assisted in making an exhibit that cannot be surpassed. With the hearty coöperation of the large growers and dealers, Messrs. D. Landreth & Sons, Johnston & Stokes, C. W. Rogers, Samuel Wilson, Henry A. Drew, George A. Deitz, and others, a display was made that more than filled our highest anticipations.

Their exhibits covered a table-space of about eight hundred feet long and four feet wide, which was filled with the choicest variety of everything that can be grown. The taste displayed in the arrangement was of the highest order, and was commended by all who visited that building. The Pennsylvania State Horticultural Society, through its membership, made a very large display of fruit, and was awarded the premium for Society display. E. Satterthwait of Jenkintown, Daniel Schmeck of Lancaster, H. M. Engle & Son of Marietta, Ellwanger & Barry of Rochester, New York, Joel Horner & Son of New Jersey, were among the largest exhibitors. The table-space assigned them was about five hundred feet long and six feet wide, and showing about twenty-five hundred plates.

To the florists of Philadelphia and vicinity, this Society is indebted for the excellent display in this department. In the exhibit of designs, cut flowers, and emblems they surpassed all expectation. It would not be proper for me to individualize in this report, but to say that all who contributed to this end deserve the thanks of the Society. I am confident that the remark made by a prominent florist of New York, will fully express the convictions of many others who visited this display. This gentleman was requested by our President to visit our exhibition and pass judgment on this particular department, and I know the exhibitors will appreciate the complimentary character of his judgment, " That it was impossible to get up a display of this kind in New York city, and that he was astonished at the magnitude and quality of it."

The show of carriages, sleighs, and wagons was limited to the building assigned, besides a space allotted in the large tent. Our exhibits could have been increased one hundred per cent. if we could have furnished protection. Many applicants were refused for this reason.

The display of agricultural implements from the farm, portable and traction engines, treshers, down to the smallest implement used by the farmer on exhibition, was there in numbers, and the best display ever shown by this Society. The agricultural machinery hall was provided with two lines of shafting, in addition to that in the main building. Two engines furnished additional power. This, with the exhibit in manufactured agricultural hall, and the large tent and annexes, will give some idea of the magnitude of the exhibits in this class. Outside of this, it must be remembered that the industrial and firm exhibits made under their own protection covered a space of about seventy thousand square feet.

It affords me pleasure to say that John Wanamaker, with his accustomed energy and progressiveness, erected on the grounds his own show building, covering a space of one hundred and twenty-five by forty-five feet, covered with corrugated iron, and lighted by electricity. The style of architecture was pleasing to the eye, and reflected credit on his judgment.

This building was filled with a display of articles of his own manufacture, from the best and richest dresses down to cooking or kitchen utensils. Furniture from the parlor down to the kitchen. School furniture and exhibits of cut glass. Manufacture of clothing from the cutting of the cloth to the completion of dress suits in all its details. In fact, this building was the center of attraction, and the Society is much indebted to Mr. Wanamaker for his great interest in its welfare and stability, and also his being the pioneer in the erection of a building to display his exhibits, and one that reflects credit upon his taste and judgment.

The main building, as before stated, was under the control of the Society of Arts, and was filled with many fine exhibits by John Lucas & Co., with paints; Brownwell, with carpets; Gillinger, with glassware; Chambers, with brick machine, and many others. Not having these entries, I, of course, cannot make any comparison or speak in detail of the very many fine exhibits in that building, the result of the labor of those who had the management of this part of the exhibition.

It was decided to open in the evenings and see what could be accomplished. This was done in order to give the workman, laborer, clerk, and others an opportunity to see our display, with the exception of live stock.

In order to do this, the Society introduced gas pipe in all the buildings, and had five hundred and seventy-one lights of this kind, and also over one hundred electric lights.

It is possible that the bad weather affected the receipts of the evenings, they were not sufficient to pay the ordinary expenses.

In conclusion, allow me to add that the result of sixteen years, connection with the Society gives me an opportunity to compare this exhibition with all others, and I must congratulate you and the Society upon being able to say that this one exceeded all others in every department, and was a credit to the State we represent.

EXPERIMENTS WITH CEREALS.

Fourth Annual Report of the Chester County Committee to Experiment with Cereals on Account of the Pennsylvania State Agricultural Society.

Mr. President and Gentlemen of the Pennsylvania State Agricultural Society:

Your committee appointed to conduct experimental plots of cereals beg leave to submit this, the fourth annual report, from Chester county. The following varieties of

Wheat

Were selected for the year 1885, namely: Martin's Amber, Valley Wheat, Golden Eureka, or Russian Wheat, Tuscan Island, Fultz, Hybrid Mediterranean, and Golden Prolific, all of which were drilled October 15, 1885. Conditions as to soil, cultivation, fertilizing, &c., were about the same. These plots were laid out on corn-stalk ground, which accounts for lateness of seeding. Out of the seven above-named varieties, only three proved themselves to be of the better sorts for the roller process of manufacturing flour, the Hybrid Mediterranean, Tuscan Island, and Valley Wheat. The other remaining sorts rank near about the same in the market as to quality; they differ only in productiveness in our soil. The ground was plowed and thoroughly pulverized, making an excellent seed-bed. All the plots under cultivation showed a vigorous growth previous to hard freezing, and promised at least full crops.

Considering that the wheat crop this year was not up to the average of other seasons in Chester county, we nevertheless made a good showing at harvest time, especially with the varieties which I shall name.

Very many of the different wheats now recommended by seedsmen and others are prolific and plump in berry, yet they rank in the market only second when compared with the old red or long berry, and the only inducement to cultivate them is their excess of yield, which makes it, in dollars and cents, an object to grow them, even at a much less price per bushel.

This year, for convenience, we laid out just one-acre plots, sowing two bushels of seed on each plot. The following will show their respective yields:

Plot No. 1, Martin's Amber, twenty-eight bushels, ten pounds; No. 2, Valley Wheat, twenty-five bushels, seventeen pounds;* No. 3, Hybrid Mediterranean, twenty-two bushels, six one hundredths pounds;* No. 4, Tuscan Island, twenty-one bushels, six one hundredths pounds;* No. 5, Golden Eureka, twenty-four bushels, nine one hundredths pounds; No. 6, Fultz, twenty-three bushels, forty-one pounds; No. 7, Golden Prolific, twenty-six bushels, seventeen pounds. All had been harvested in good condition.

The whole were similarly fertilized with two hundred and fifty pounds to the plot, or acre, of a high grade of phosphate. The above briefly gives results as to our wheat-culture.

Oats.

Those familiar with our last annual report, will remember that we discarded all varieties previously cultivated save the Welcome and Challenge. We are now ready to challenge all competitors with the Welcome oats. Its early maturity, large and stiff straw, heavy kernels, etc., defy comparison with any variety we have hitherto cultivated. In addition to eight acres of Welcome oats, we had, in our experiments, three plots of one acre each. Plot No. 1, Welcome oats; No. 2, Challenge, and Plot No. 3, Yankee Prolific or Bohemian oats. This variety should have been named Yankee Fraud, as it with us, under the same treatment, time of planting, fertilizing, etc., proved almost worthless. It stood ten days later than the other varieties, and was even then cut green. Of the Welcome—Plot No. 1—we harvested sixty-nine bushels, stuck measure, to the acre, weighing forty-three pounds to the bushel, which equals ninety-two bushels, twenty-three pounds legal measure. Plot No. 2, Challenge oats, sixty bushels to the acre, weighing thirty-six pounds to the bushel, which equals sixty-seven bushels, sixteen pounds legal standard. Plot No. 3, Yankee Prolific, thirty bushels, twenty pounds to the acre, weighing twenty-eight pounds to the bushel, making twenty-six bushels, twenty-eight pounds to the acre. The whole was fertilized with a high grade of commercial fertilizer. Their enormous growth of straw, standing erect over five feet high, attracted the attention of all who witnessed it. Suffice it to say, the Welcome oats with us thus far stands first.

Corn.

Of the corn crop, we are not possessed of facts sufficient to be interesting to the Society. All the plots, together with the entire twelve acres under cultivation, promised an extraordinary yield up to the season for forming the ears, when an almost unprecedented rain-storm so completely caused a wreck of the entire stand, and blasted the crop so materially, that we did not feel like attempting an estimate of the respective plots under cultivation.

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*The star indicates varieties of a No. 1 quality.

All of which is most respectfully submitted.

DAVID H. BRANSON,
Committee for Chester County.

Januarg 20, 1886.

Mr. McDOWELL, who was detained at home, was unable to make a full report.

Mr. TAGGART moved to strike out of the report the name of the maker and numbers of the fertilizer used in the test.

Mr. MILES amended that, in the future, the name of the maker of fertilizers be omitted and an analysis of the same.

Agreed to.

The PRESIDENT appointed Messrs. Mackey, Kirkpatrick, and Holstein a committee to audit the accounts of the Treasurer, and Messrs. Barto, McKean, and Jamison as tellers to conduct the election.

The PRESIDENT referred to the financial condition of the Society.

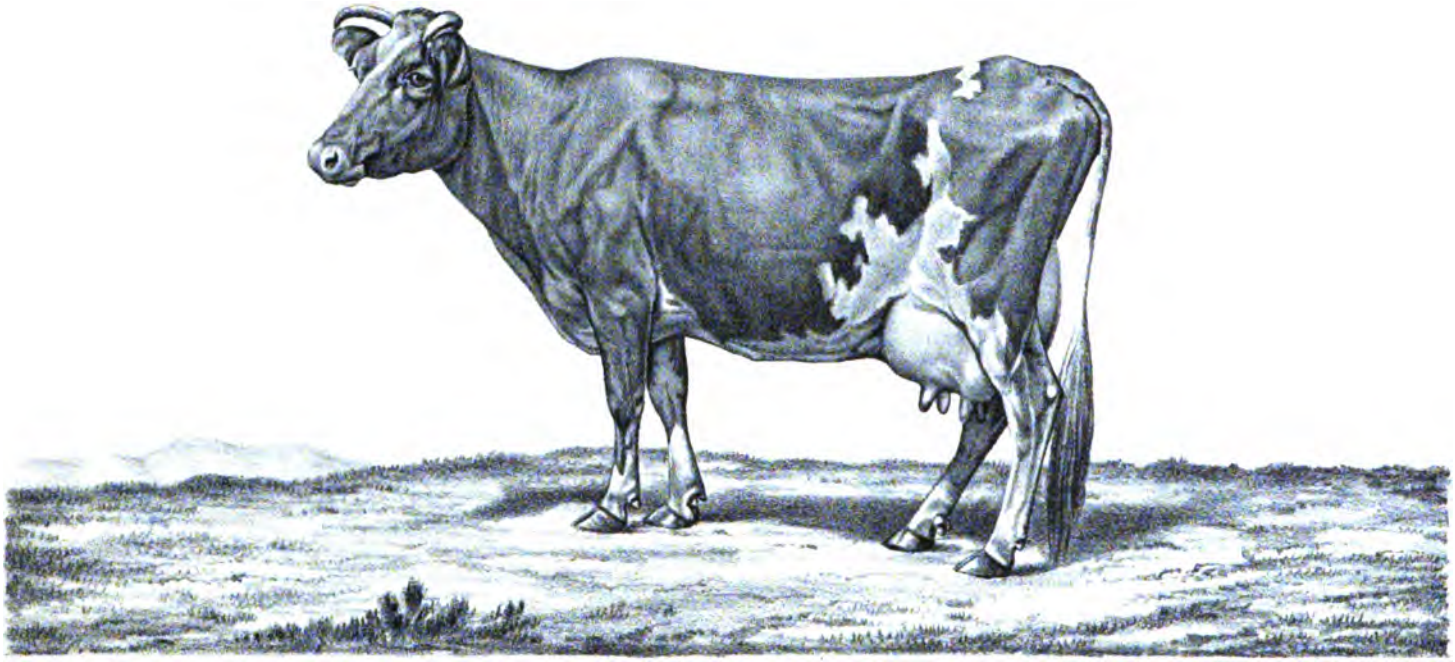
Mr. LAMBERT made a statement, informing the committee of what efforts were made to secure funds, when that gentleman made a motion that each member of the Executive Committee and Society constitute a committee to solicit life membership in their section of the State.

Agreed to.

Mr. SPEER offered the following: That the members of this committee be requested to state what amount they will subscribe as a loan, to be paid in October next, with six per cent. interest, and that the President be empowered to give such notes for any money loaned.

Agreed to.

The committee then adjourned *sine die.*



IMP. JESSIE OF THE MANOR,
Owned by Mark Hughes, Avondale, Pa.

ANNUAL MEETING OF THE SOCIETY.

The members of the State Agricultural Society having met in the rooms of the Society in Harrisburg, January 30, 1886, at the hour fixed upon for the opening of the annual session, Mr. Seiler moved that Mr. Neiman act as chairman of the Society meeting.

The motion was seconded and agreed to.

Mr. Wilhelm moved that Mr. D. W. Seiler act as secretary of the meeting.

The motion was seconded by Mr. Barto, and agreed to.

The Chairman. *Gentlemen:* This is a meeting of the Pennsylvania State Agricultural Society for the purpose of electing officers and transacting other business. It has been shown to be your pleasure that I should preside, and that Mr. Seiler should be secretary. The Chair awaits your further pleasure.

(After some time,)

The President. If there is nothing to be presented now, the persons selected by the Executive Committee last night to hold the annual election will please take their positions and prepare to receive the ballots of the Society. The gentlemen selected, I believe, are Messrs. Barto and McKean. Mr. Jamison will please write down the names of those who deposit their ballots.

(While preparations were being made for the balloting,)

Mr. Seiler. Under an arrangement made with the Society of Arts, their agreement must be accepted or rejected. The agreement was to continue eight years longer, provided the members of the Society approve the same, and I move you that some action be taken on it.

The President. That is an agreement between the State Society and the Society of Arts of Philadelphia. That agreement has expired. The question now arises, Is there a desire for the continuation of the agreement for eight years?

Mr. Seiler. The condition is, if the Secretary approves, it will continue for eight years longer.

The President. That is a matter not between the Executive Committee and the art society, but between this Society and the Society of Arts. Therefore, it is necessary we should take some action in regard to the matter.

Mr. Seiler. The Executive Committee of this Society has no right to bind its successors for eight years; it rests with the Society proper to do that. We had an exhibition last year in which the Society of Arts was connected with us. So far as I am concerned, I am opposed to the continuance of the arrangement. I do not think what was expected of the Society of Arts has been realized at all, unless by the Society themselves, or individually.

The President. This agreement, in a manner, virtually relinquishes or releases certain buildings to this party.

Mr. Seiler. The annex, and the grounds surrounding it, to a certain extent.

The President. If this agreement is extended, that arrangement will be carried out, and those buildings will be beyond the control of the State Agricultural Society.

Mr. KELLER. Has the art society been of any benefit to our State Association?

Mr. SEILER. That is a question. In my opinion, none whatever.

Mr. KELLER. If they have been of no advantage to us, I say drop them. If they have been a benefit, I will favor a continuance.

The CHAIRMAN. I trust members of the Society will grant the Chair the privilege of saying a word further, while this matter is before the meeting. In my experience of last year, and the experience of other members of the Executive Committee, at least, it was a mistake to relinquish their right to the control over any part of the exhibits. I do not think the Society was benefited in the least by it. It was an experiment, and I think the Executive Committee will agree with me that it was a failure. I trust members of the Society will very carefully consider the matter before they extend it.

Mr. KELLER. If it is in order, I move that it be dropped.

Mr. SEILER. I move that the extension of the lease be not ratified.

The motion was seconded by Mr. BARTO.

Mr. LANGRETH. Before that question is put, I would like to say something on the subject. It occurs to me that if we fail to confirm this lease, we are putting ourselves in an undesirable position. In the first place, I can say to you candidly, because I am one of yourselves, that the State Society, I believe, cannot hold successful exhibitions in Philadelphia unless they associate with this same Philadelphia Association, or unless they engraft into the State Society some organization having its headquarters in Philadelphia, and composed of men capable of making an exhibition outside of agriculture. To be perfectly candid with you, I would say that the impression is abroad in Philadelphia, that the State Agricultural Society has gone to Philadelphia to make money; that it has gone there because it was believed that Philadelphia is a good field from which to reap; that it is a country organization—as it is, of course—and its interests are altogether agricultural, and being such, it cannot command the interest in Philadelphia it will command if its interests are made mechanical and industrial, and as they ought to be, and as they can be, by associating with it some mechanical and industrial association. This Agricultural Society, I believe, cannot draw to it mechanical and industrial exhibits such as can be drawn by an association of that character.

It has been said that the exhibition of last year was not a success. I beg to differ on the subject with the parties who made these statements, with all respect to them. Previous to last year, that building was devoted to agricultural exhibits and agriculture, but still it was not crowded up. The agricultural section took over one half of it, and the section devoted to manufactures had less than the other half. Now, this year the agricultural section was entirely out of it, and the manufacturers' section, not agricultural, absorbed the whole building and part of the outside, showing very conclusively that the department of manufacturers had very greatly increased, because it more than filled the building which the previous year was more than half occupied by other than manufacturing interests. The building was filled by people interested in manufactured articles in general, covering the whole range of Philadelphia manufactures. It interested those people; interested the proprietors of these establishments, and the workmen and the clerks, and in addition to the families of these workmen and clerks who made those articles, drawing to the Society and its exhibits a great interest, and greater knowledge, which was not developed the previous year. Now, it occurs to me that if we turn our backs, as it were, upon the manufacturers of Philadelphia, and claim to be able to run this exhibition without their aid, we are doing a very injudicious thing. For my part, I would like to see this Society united with it, or any body to make this Society a success, provided it is constitutional. And it is not unconstitutional to pass this building over to the Society of Arts, because we have a precedent. A building was turned over to the dog-fancier's society. It seems if this Society guarantees to the art society a sufficient sum to meet its expenses, it is giving away so much money. But it is not so at all. It is simply allowing the Society of Arts to pay its clerks and administration, which, if it were not there, the State Society would have to pay off. There are janitors, the distribution of circulars, postage, and all matters connected with the administration of that department, which, if the Society of Arts does not assume, the Agricultural Society does assume. The Society of Arts can do it as cheaply as the Agricultural Society can do it. And those interests, coming from a separate body, will have more force among the people whom it is desired to reach. I hope you will understand me clearly in the idea I mean to convey, that this guarantee fund is not thrown away. The same amount of money would have to be spent by the State Society without, as with, the Society of Arts. They do not ask the whole amount. They simply ask the guarantee of a certain sum in case the receipts meet that sum. If they do not meet that sum, they will be satisfied with a lesser amount. There are certain people in Philadelphia, manufacturers, who give their time to it day after day, and they held probably twenty meetings at their office on Thirteenth street, and devoted their time to it; and if they had not organized themselves for the advancement of the Agricultural Society, and not for themselves at all, except the exhibitors—if they had not organized themselves to work, I can assure you you would not have had half the exhibition you have had.

Before any adverse action is taken in this case, I hope you will give this matter thorough consideration, for I believe it is the sheet anchor and the source from which we will receive our greatest support in the future. You must interest people in the products of their own State.

Now, what else can the Society of Arts do? It is composed of merchants and manufacturers who have influence with the railroad companies. They are the people to be called upon to see the railroad companies and secure exhibits for exhibition, and they can influence the citizens of Philadelphia a hundred times more than the members of the Agricultural Society can, because they are the shippers, they are the parties who support this organization, and they are the active men in business, and we cannot and must not turn our backs upon them; if we do, I think it will be ruinous.

Mr. Speer. They appear to think that Philadelphia is the only town in the State of Pennsylvania. We have tried the experiment one year with the Society of Arts. The exhibition, no doubt, was a very fine one, but the pay part of it did not come up. We made a mistake, I think, last year—we ignored the whole western part of the State. We had no excursion and no advertising done in Pittsburgh or any of the towns adjacent. I think they made a mistake when they wanted to confine it solely to Philadelphia. This Society is a State Society, and I think if the thing is worked up properly all over the State when it should be, and if the Committee of Arrangements were to make such arrangements with the railroad companies that the people could get there on very reasonable fare, there is no doubt that we can make an arrangement about getting freight to the exhibition. I think there is no doubt about there being a very successful exhibition, but I think it should be for the benefit of the whole State of Pennsylvania, and not for Philadelphia alone.

Mr. KELLER. This is rather a delicate question, to be sure, but I feel disposed to rather be adverse to its continuation. If the majority of the members here think it proper to give them a trial another year, I would be willing to have that motion so amended. Then, if it proves to be a success, or an advantage to the Society, we can do as we please. I therefore offer an amendment that we give them a trial for another year.

Secretary SEILER. The question is on the confirming of the agreement. We can only act upon that. We cannot confirm it for only one year. We would like very much to hear the views of the President, as expressed in his report to the committee; and there are several other gentlemen who belong to the Executive Committee whom I believe it would be well to hear from.

Mr. WILHELM. I think we can reach that by reading the President's report in reference to it.

Mr. SHANER. I reside about twenty miles from Philadelphia, and for a number of years I have been a member of the State Agricultural Society. During all those years, the State Society has been self-sustaining; we have managed to get along as an Association. Last year it was deemed advisable by the Philadelphia board of managers to connect the Philadelphia society with the State Society. The annex necessitated the expense of from twenty-five thousand to thirty thousand dollars. It has placed the State Society in a condition now, as has been told you by the President, almost in the hands of the sheriff. My experience has been that the annex of the art society has been detrimental. If we had expended one third of the money that has been expended by the art society of Philadelphia, we would not have enough room for exhibits. Besides that, we could be assured of the subscriptions from citizens of Philadelphia. A part of those subscriptions have been paid. Why continue this contract with them? They have not come up to their own work. Why have they failed so signally? If the Society cannot sustain it, why allow it to drag it to the ground? If you had spent one third of the money that the State Society has been compelled to pay to the art society, we would have filled our buildings. It is not a very pleasant thing to have the officers of the law knocking at the door; and we have to come in and pay bills—we who are away from Philadelphia. Now, we are asked to revive the contract for eight years longer, and thus help to drag us down deeper into this condition of affairs. I hope it will not be done.

Chairman NEIMAN. The Secretary will read that part of the President's address bearing upon the subject.

Secretary McCONKEY read the extract referred to.

(Mr. SHANER in the chair.)

Mr. SPEER. If we had what it cost us in the way of improvements to offset what benefit we received from the Society of Arts, there would be very little due them in the way of remuneration.

Mr. NEIMAN. While the matter is under discussion, I desire to reply to a remark or two made by the gentleman from Philadelphia, (Mr. Landreth.) In the first place, he said the Society could not afford to turn its back upon that particular interest. No such desire prevails among those who are opposed to an extension of this lease. On the other hand, we invite, as we always have, the exhibits from manufacturers throughout the State of Pennsylvania, and beyond its limits. We do not propose to abrogate these laws to-day, or anything of the sort suggested by the gentleman from Philadelphia. I am among those who believe this Society can manage its affairs more successfully than by dividing the duties with other associations. That heretofore we have had exhibits from manufacturers, there is no question or doubt; so that we do not propose, in the abrogating of this lease, to do anything of the kind. We propose, as we have done for years past, through our own officers to invite those people, and to encourage them, as we have always done. It has been, I think, pretty clearly demonstrated that the people to whom this lease was made did not come up to what was expected of them, or what was promised by them. Take, for instance, the matter of transportation. In my own section of the State, as near as we are to Philadelphia—the Lehigh valley—we had no excursion rates, or advertising, or anything of the kind to induce people to attend the fair. Why? Simply because that was a matter delegated, in a manner, to this society. When the State Society managed its affairs itself, we had all the arrangements and all the accommodations we could desire. We had low rates of freight fares and excursion rates. The same may be said in the western part of the State. When Mr. Speer and I compared notes, we found that the people generally, outside of the Society and its members, scarcely knew there was a State agricultural fair being held in Philadelphia, simply because the matter was entrusted to a Philadelphia society which had failed to do its duty. Now, I think that experience has demonstrated to us that a division of the duties and labors of the Society was a mistake. We have our own officers; we pay them; some of them are hired by the year, and it is their duty to do just what this association was to do, but did not do. With all respect to the gentlemen who advocate a continuance of this lease, I say that this Society would be better off to take control of its duties, as it has successfully done for many years past.

Dr. KENNEDY. Before going into a discussion of the matter, it is very important, and far more than has been presented to us to-day, to look carefully at all the surroundings. I beg to say to my friend from Pittsburgh that the intention was to have an organization in Pittsburgh which should be efficient. Had an organization been established in Pittsburgh for the purpose of aiding the Society's exhibitions upon the same grounds as the Philadelphia Art Society was, the same good would have been done in Pittsburgh as was done in Philadelphia through the Society of Arts. If Pittsburgh, and perhaps other points in the State, will form an organization which will coöperate with the State Society in the same way that the Society of Arts has coöperated with it, we would do much better—for I stand here to affirm that the Society of Arts did its duty.

In regard to the exhibitions of the Society, which were referred to just now by the gentleman who sat on my left, I would remind members that the most successful exhibitions of this Society were held under circumstances like these—were held when we coöperated with the society in West Philadelphia—and the experience derived from coöperating with that society in Philadelphia was that which taught the importance of having an organization in Philadelphia, and known to Philadelphians, in which they had confidence. As a member of that Board, in making the contract for the exhibition had with our Society, I may state that the experience derived there was the basis on which we acted in securing the coöperation of these two societies in Philadelphia; that is, the Society of Arts and the State Agricultural Society. These are days of coöperation, and we effect results by bringing together and by association. Times have changed in that regard, and exhibitions have changed too. The complication in regard to exhibitions is infinitely more than it was years ago. There is more to require organization in getting up exhibitions successfully, and by far, than was required in years past. Everybody who has studied exhibitions can certainly see this. There was a private antagonistic element, and that antagonism made it necessary for us to have an organization in the Society; that antagonism made it indispensable that we should have a Society of Industrial Arts, and to have a society of arts that would do its best to get a share of the exhibits. Yet, as gentlemen very well know, the very exhibits the Society of Arts was most anxious to get were, in consequence of the better known organization, the Franklin Institute, placed elsewhere; and—as an old member of the society, I can speak for it—I say, sir, that the Society of Arts sought to obtain that machinery in motion which the Franklin Institute anticipated, having been in the field before the Society of Arts' contract was finally made with this Society. But had the Society of Arts been in existence from the beginning, when this was first talked about, before this lease was effected, and came right down to time, I have no doubt that it would have been able to obtain a moiety of those exhibits which made that exhibition so attractive. That was the only point at which the exhibition failed in the main building, and the reason is as I have announced, and every person in Philadelphia knows it. It arose from no lack of effort on the part of its members or committees. There were strong committees for the purpose of seeing those who had machinery in motion, and they personally interceded on the subject, but they said: "We have committed ourselves to the Franklin Institute, and you cannot get it." So much, then, in regard to coöperation, and so much in regard to the indispensableness of coöperation. I argue that we can succeed better with than without it.

Now, what is the nature of the contract? It involves simply this: That if the expenses of the Society of Arts are as great as two thousand five hundred dollars, the expenses over it would be that which this State Society would have to incur—if it is two thousand five hundred dollars, this Society would give two thousand five hundred dollars. But the society has so managed its business that it will not demand two thousand five hundred dollars, but will get along with perhaps one thousand five hundred dollars out of that, showing the character of the business men in Philadelphia who have taken hold of this enterprise, and the determination not to tax this Society one cent more than absolutely necessary.

Now, gentlemen, this Society of Arts was organized not for the purpose of making Philadelphia the only city which should have an exhibit of industrial arts at the State fair. As is well known, it is an organization of the friends of this Society, and, so far as I know—and I attended every meeting—nothing antagonistic to this Society was done or hinted at, but everything was done in good faith. I defy any organization in the city of Philadelphia to do its work more conscientiously than that was done—and that from personal knowledge—and they are loyal to this Society, as you know them to be. I am surprised at the charges made by gentlemen here. It is impossible to have a better friend than the Society of Arts. The very largest manufacturers of the city of Philadelphia are among those who work with that society. You cannot go into the city of Philadelphia to-day and get a better body of men. If the Society of Arts had not existed, you could not surround yourself with men better able to do that work.

Now, what are they doing? They are moving in this matter to collect money. This business of collecting money for this Society is practically in their hands. They are the men who have put their names down, and they are the men whom we must keep as our friends. To turn a cold shoulder upon them would be to destroy the movement which is on foot in Philadelphia in regard to the collection of money to pay our debts. Why? Because there would be no organization in that city to represent the measure which you have in view, and those persons who have labored, and are laboring, would feel paralyzed by an action of the kind contemplated here. You may consider that a strong expression; it can be verified, if necessary. I beg to assure you, and repeat with emphasis, that if this contract be not extended, that the effort that is now being made in Philadelphia will be paralyzed, so far as these parties are concerned. One half of the individuals who signed the call for the meeting that was sent to me, were prominent members of the Society of Arts. Their names are connected with it, and their subscriptions are down.

You perceive, gentlemen, this is no small matter. We are now working in harmony with a movement which is in good faith. That movement has not made much progress, as you see. It will be understood by everybody present that the Society needs friends among manufacturers; you all know that. It has friends now among manufacturers. Can this Society afford to offend them? That is the question.

Col. TAGGART. Does it deprive them of any privilege they have?

Dr. KENNEDY. It deprives them of the percentage. When you help them to côme out, it is not like having them all apart.

In regard to one or two other matters which have been mentioned on this floor: The Society of Arts, so far as I am aware, was never asked to do anything in regard to railroad fares.

Mr. LANDRETH. That is so; they never were.

Dr. KENNEDY. With the permission of the Society, the charge was made by the Secretary that they did not cut the fares down. It was ready to do it, and ready to go and see the members of any organization and its friends among those persons.

If there has been any other objection made on this floor to-day, I should like to have it repeated. I said some time ago that the Society of Arts had done all they agreed to do, and they spent every penny they got.

Now, in regard to the exhibition that is charged with not making the exhibition a success. Why, so far as the main building was concerned, the exhibition was a great success; it succeeded admirably. The Society of Arts did not receive one cent of the gate money, as you gave it to the Exhibition Company in West Philadelphia. They never asked for it. It was not made a party in the sense that I think it ought to have been made; that is, in the sense of the other contractor—the Exhibition Company. The Society had all the receipts; gentlemen will please remember that.

Then, again, it did not certainly fix the date of the opening of the exhibition. You all know that that was an unfortunate thing. This Society had found the weather very hot a year before, and went to the other extreme of having the weather too cold. It was an extremely unpleasant thing to be upon the exhibition ground during a portion of the time, and gentlemen did not come. You will remember that. There was a rival exhibition in West Philadelphia, and there was the weather. And then, so far as putting up these buildings was concerned, they were not necessary; tents would have answered the purpose. Flowers and fruits look better under tents than under frame, as everybody knows. Therefore, to say that the expense of those buildings was incurred because of the Society of Arts, is altogether without foundation. There is no gentleman present but knows how beautiful flowers and fruit look under canvas.

But I had better conclude, as I merely wished to repel the charge that was made.

Secretary SEILER. I would ask the Doctor whether he did not vote for the contracting and the construction of those buildings?

Dr. KENNEDY. I do not know, probably I did, because I followed my leader. Mr. Wilhelm advocated it, and, as a member of the Philadelphia committee, I voted for it. I was loyal to my chief.

Mr. SHANER. You are deserting him now.

Dr. KENNEDY. I am not; but I am placing in his hands the power to do more good than he ever had, by maintaining the coöperation of the Society of Arts.

If anybody has any other objection, I would like to hear it.

Mr. SPEER. No exhibition can get along in Philadelphia without they associate with some society or organization there, as some other exhibition society. Am I right?

Dr. KENNEDY. I do not say that, but I say that is the way of winning success. This Society won a success by coöperation with the society of West Philadelphia that surprised us all. That is the way to success. I am just talking now about the most brilliant achievements. A society that drags along with exhibitions like the last had better die.

Mr. NEIMAN. Who managed the affairs at West Philadelphia?

Dr. KENNEDY. The society which was called "The Permanent Exhibition Company."

Mr. NEIMAN. Had they anything to do with the exhibition—didn't we manage the whole affair?

Dr. KENNEDY. They provided the exhibits that were in the building. That is the way we propose the Society of Arts shall do.

Mr. SHANER. They were all there from the Centennial exhibition.

Dr. KENNEDY. It was a grand thing to have them.

Secretary SEILER. Wasn't it a grand thing for the Permanent Exhition to get our Society to go there?

Dr. KENNEDY. I do not deny that.

Mr. MILES. Did not the Permanent Exhibition Company give us the finest place to hold an exhibition that ever was erected in the United States?

Mr. BRANSON. And ten thousand dollars.

Mr. MILES. And we went there, and made a success out of it after they had failed to make a success for themselves.

Dr. KENNEDY. That does not affect the case at all, if we made money by it.

Mr. KELLER. Am I right? We received money from the Centennial exhibition, and this money helped us greatly.

Dr. KENNEDY. We got a share of the profits, and we made money.

President NEIMAN, (in the chair.) The matter of extending the lease is the subject under consideration, and the Chair must insist upon confining members to that. The discussion has taken too wide a range.

Dr. KENNEDY. I shall be happy to carry out the wishes of the Chair. I maintain now, in order to succeed in Philadelphia, it is necessary we should coöperate with another organization.

Secretary SEILER. We had with us a number of business men of Philadelphia we could not do anything with, as Mr. Clement Hoopes and Mr. Chambers, and there were three or four others of the Society of Arts that I could not do anything with.

Dr. KENNEDY. Then I say we will get them if we do it in that way.

Secretary SEILER. Then they have not this Society at heart.

Dr. KENNEDY. They prefer not to work in an organization of which they are not members. They are manufacturers—and I want to make a point here—I warn this organization—I do not ask that this thing be continued for all time, but just now, in this crisis, do not touch it. As a friend of this Society, and an ardent lover of it, I warn my brethren not to touch this thing now. [Applause.] There is to be a meeting on Thursday night. The success of that meeting will hinge on the action of this Society to-day. That meeting has been called by Colonel Wilson, at the Alden Hotel, for the purpose of working this thing up with the business men of Philadelphia. Now, you cut off the working men of Philadelphia by this action. You expect their work, and subscription, and coöperation, but you will be disappointed in your expectations unless you are careful.

Mr. ALLEN. How much has the Society of Arts contributed for the benefit of this Society—that is, in helping us out of the debt of twenty-eight thousand dollars, I believe? In less than three weeks' time they put their shoulders to the wheel and relieved the Zoo, because it was a Philadelphia association exclusively; but, because this happens to be a society of hay-seed grangers, they hold Philadelphia over our heads, and say we cannot succeed without them. Now, I would like to have from the Secretary what benefit we received from the Society of Arts.

Secretary SEILER. So far as the Society of Arts is concerned, we have no control over them whatever.

Mr. ALLEN. That building was filled in 1884, just as well as in 1885, and possibly just as attractive. We had an exhibition there from a pickle-house of Pittsburgh, which was more admired than anything in the whole building this last year. They took that paint-house from the outside of the grounds, and put it in the center, and filled up one half of the inside.

Mr. SHANER. You have just heard it said by our friend, Dr. Kennedy, that the amount of money that would be subscribed hinged on the action of this Board to-day. You also heard it said by my friend, Mr. Landreth, that the people of Philadelphia had made up their minds that we came there to make money. Now, in answer to Dr. Kennedy's assertion—first, that they are holding their subscriptions to see whether they will be kicked out or not—and the doctor says to you if the action of this Board does not ratify this contract, they will not give any money—if that is the case, what do we want with them? Their heart is not with us.

To answer further what Mr. Landreth says, "that we came there to make money," they want "the gentlemen with us to get the money." There are the managers, who can tell what they got for the grounds. It is enough for us to know that we are indebted twenty-eight thousand dollars, and no money to pay it, all incurred in the last exhibition. What was the exhibition of 1884? Your official statement that we had paid fourteen thousand dollars on permanent indebtedness, and a surplus of six thousand dollars, answers the question. This season we get back twenty-eight thousand dollars, and why? It is said here that these buildings were not required, and, in the next breath, he says he voted for those buildings, and then instructed the committee to go on and build. The erection of those buildings continued for three weeks, and, on the last day of the exhibition, they were not completed. Why? Because the art society kept us back, and drove us to the wall. Every member of the Executive Board knows that these are facts I was upon the ground nearly every day.

When the question of putting up tents was considered, it was announced that the Executive Board had no money to apply to it, and Dr. Kennedy, one of the Board, said it would be a dangerous experiment in case a storm should blow them over, and he said it was not advisable to have tents.

Dr. KENNEDY. I say I was loyal to my chief.

Mr. SHANER. If any money has been made, it was not made by the Pennsylvania State Agricultural Society. We do not know whether they made any money or not; but, until we renew the contract, they are not going to give us anything.

Dr. KENNEDY. I am surprised at the remarks of the gentleman who interrupted me. All the figures are in this room. The report of the Society of Arts is here. That society expended seven thousand dollars toward the exhibition. By this contract they are prevented from making a cent.

Mr. ALLEN. If they have not made any money, and are not going to make any, why are they so anxious to renew the lease?

Dr. KENNEDY. I am a member of this society, and want help. I understand the matter of exhibitions in Philadelphia very well, and no man understands them better than the gentleman on my right, who was the chief of the agricultural bureau of the Centennial, (Mr. Landreth.) He speaks by authority. We say, in order to make a successful exhibition, you must get the manufacturers of Philadelphia into the harness, if you have any harness. It is of no advantage to them. I have yet to have pointed out to me any profit which they can make out of it. I have been told frequently in Philadelphia, "You would not meet with the gentlemen of the Society of Arts." "What good will it do?" "They will be a benefit to the State Society. It will not be any benefit to them at all. That society cannot make any money out of this thing. You are the corporation that is benefited, or that will be. They have provided for your buildings one of the grandest exhibitions you have ever had." A successful exhibition, in my opinion, is one that brings in all the departments of industry, and that is precisely what was done in 1885.

Mr. **SHANER.** Does not the gentleman think that the State Society can do the same thing alone?

Dr. **KENNEDY.** Not as well.

Mr. **SPEER.** How about the exhibition at Pittsburgh? They went into this Society. I do not want them to go in. If the Agricultural Society had gone out on the grounds by themselves, they would have made money.

Dr. **KENNEDY.** I am not a citizen of Pittsburgh, but of Philadelphia, but I would be willing to help get the exhibitors of Pittsburgh to exhibit at our fair.

Mr. **KELLER.** Have not the manufacturers of Philadelphia the same privilege and opportunity of exhibiting that everybody else has? Why must they come in as an organization, when they have the same facilities that others have?

Dr. **KENNEDY.** Exhibits are now very much in demand. Societies in St. Louis, in Louisville, and recently in New Orleans and in Cincinnati, have their agents in Philadelphia going round to the manufacturers and asking them to show. That is a thing that was not done before, and you have to have your own body organization for the purpose of occupying a higher position than these individual agents do; so that a man who is engaged in the show business shall go and say to such and such a man, or ask him, "Is Mr. Landreth a member of the Society of Arts?" or "Is Mr. Clement Hoopes or Mr. Cyrus Chambers personally connected with the Society of Arts?" And so through the whole range of exhibitors in Philadelphia. It is a power working for you.

Mr. **SPEER.** It is a power that has not been wisely worked.

Dr. **KENNEDY.** I still speak here as a member of this Society, and a member of its Executive Committee, and helped organize that society for the purpose of helping this Society.

Mr. **MILES.** As the President of this Association was connected with it at that time, and saw the workings of this Society and the Society of Arts, and as he has seen fit to make mention of the fact in his report, I would like to hear from the President in a more detailed form.

President **WILHELM.** I had hoped, after my reference to the Society of Arts, there would be no occasion to take up any part of your time in the discussion of this question, but the remarks of some of my brethren, particularly Brother Kennedy, surprise me. He says he has followed his chief. If he refers to your humble servant, gentlemen—if he had followed your chief—we would have continued the control of that main building. [Laughter and applause.]

Now, gentlemen, I will state what I know, and I think gentlemen will bear me out that these are the facts. I believe my experience in life was such that I could foresee the possible financial embarrassment under which we are laboring by taking that step. Now gentlemen of the Committee of Arrangements who are here will bear me out, that I retired from the chair of the Committee of Arrangements and addressed them fully on that subject. I pointed out to them frankly that, if they entered into this agreement, the probability would be that it would involve this Society in debt. After showing them what the probable cost would be, they said, "We will abandon it." I supposed it was abandoned. A proposition had been previously made by this Association—they invited the proposition—and it was made adversely to my judgment. As you know, the President is something like a figure-head: he has no right to make a motion, but only to put the question. The proposition was made to pay two thousand five hundred dollars. I had supposed, after presenting a statement of the probable cost and the situation of the Society, it was abandoned. After a long time, between sessions, the Society of Arts sprung a paper, and the Committee of Arrangements said we would reply. This agreement was prepared and was submitted to your Committee of Arrangements without the proviso. I said, "I will never sign that, because the officers of this Society have no right to sign an agreement extending the period of the lease beyond the term of their office."

Now, gentlemen, when this was entered into, it was entered into, I admit, in good faith. The Society of Arts knew that this provision was in the agreement, and that it must be ratified in this meeting. How are we met now? We are met now by the declaration that if we do not do this it is fatal to the Society. I beg leave to differ. Successful exhibitions have been held by your Society without leasing away to any organization, whether it be kindred or not. We have been successful, and I believe we can be still, without leasing away or giving others control of this building. It is very clear to every business man that the more confined an organization is, the less expenditure in the administration of that organization.

Gentlemen, we do not want to impress upon your minds, or in any way create the idea that the Committee of Arrangements are opposed to the industries of Philadelphia, or wish to turn them out. There is no such disposition on the part of a member of that Committee of Arrangements, but we invite them in, as we did in 1884, when that building contained more, gentlemen, than it did in 1885. With all the disadvantages, the roads and everything else in bad condition, I hold that the building contained more than it did in 1885.

In 1884, the applications for space were greater than the capacity of the Society to supply. In giving up your main building, it absolutely necessitated the erection of additional buildings.

In addition to that, I want to say here, gentlemen, that, as an officer of your Society, I tried it, and the members of the Committee of Arrangements from the country yielded in every possible way to accommodate the wishes and views of our friends from Philadelphia. I think it was Dr. Kennedy who moved to extend the exhibition three weeks. I need not say that that resulted in great loss.

Now, that this Society of Arts is working in perfect harmony with the State Society, I beg leave to differ. Complaints came to me as "your chief." What did the gentleman say I was—"President," or "chief?"

Dr. KENNEDY. I called you "chief," and I recognized you as Chief, and took off my hat to you. (Laughter.)

President WILHELM. Complaints came to me from members of the Society, and the Executive Committee: "Why did you do this?" For the purpose of uniting Philadelphia interests; and we were encouraged to hope, and to promise that Philadelphia would come to our rescue and advance money to erect this building. Did they do so? Complaints came from members of the Society stating that the Society of Arts charged them for space, or wanted to, and as good friends of this Society as they are, and they took their exhibits away and did not exhibit with us.

Now, I want to say that the gentlemen who executed this lease, or prepared it, did it openly, and knowing that this lease was to be submitted to you for ratification or annulment. But now we are met by the declaration, "If you do not do this the results will be fatal to your Society." I do not think they will be if you do not ratify it.

Mr. **BRANSON**. I have listened to this discussion with a great deal of interest, and I have been trying to find out why it was that the State Agricultural Society should not be a success. You and all of us know we had one of the grandest exhibitions that has ever been held in Pennsylvania. I will include the Art Society, if you please, because I claim that no society can be a success unless it is complete in all its various appointments. But I am sorry to listen to the gentlemen who have tried to have us believe that the State Agricultural Society cannot be made a success unless you take in its limits other than agriculture. That has not been the history of the Pennsylvania State Agricultural Society since its inception, and I would like to have the gentleman tell us why the exhibition was a failure, inasmuch as the great exhibit made by the Art Society was upon the ground. I do not claim that the Art Society is altogether responsible for our lack of finances, and I do not claim that the great agricultural interest of Pennsylvania is not fit to run an agricultural society—I mean, that that interest cannot conduct an exhibition of their own character. I say they let it go by default. I claim that you cannot destroy the agricultural class or destroy its inhabitants. It will live as long as the earth lasts. I am in favor of the Pennsylvania State Agricultural Society conducting its affairs from A to izzard. I do not want any art society, or any kennel club, or any poultry society to manage an exhibition in their own way. I want the State Society to have the control, from the mammoth bovine down to the peanut boy. [Laughter and applause.] What did we do in Philadelphia? The Exposition Company invited us there! As you have been told here, we want no defense, but a defense has been made better than I could have done it myself. That exhibition not only did invite, but gave us here about four and twenty thousand dollars to come. They wanted us there—as much as to say the Permanent Exhibition cannot exist without the State Agricultural Society. What is the result? We never before, since the organization of the State Agricultural Society, had a failure east of the mountains until last year, in Philadelphia. I must agree with most of the reasons that have been advanced here to-day. I am strongly in favor of the State Agricultural Society conducting its own business all the way down, and making the awards and paying the premiums. [Applause.]

The **CHAIRMAN**. The Pennsylvania State Agricultural Society last year leased a portion of its buildings and grounds to the Philadelphia Art Society. They come here now to have this lease extended. The motion now before the house is that the request be not granted.

The question being put, it was agreed to.

(The Society then proceeded with the balloting for officers.)

The chairman of the Auditing Committee made report as follows:

Mr. President, we have examined the Treasurer's accounts and vouchers accompanying the accounts, and find them correct. The committee did not, of course, consider it their duty, and it is not in their province, to pass upon some of the expenditures in that account. They therefore simply present their report, stating that they find the accounts correct. There are a few items upon which the committee desire to make a suggestion, but I presume I had better state them after the report has been read.

The report was then read as follows:

JOHN B. RUTHERFORD, *Treasurer, in account with Pennsylvania State Agricultural Society:*

1885.	DR.	
Receipts at gates,	$24,580 89	
School tickets,	3,319 10	
Grand stand,	1,031 95	
Entry fees,	1,644 50	
Exhibitors' tickets,	502 50	
Annual members,	100 00	
Restaurant concessions,	3,529 91	
Pennsylvania railroad subscription,	2,000 00	
Thirteenth and Fifteenth Street railroad subscription,	300 00	
State appropriation,	2,000 00	
Fence advertising,	200 00	
Gas bills,	33 09	
Life members,	100 00	
Subscriptions,	225 00	
Loans,	9,800 00	
Philadelphia and Reading railroad coupons,	6,242 50	
		$55,609 54

1885.	CR.	
Interest on loans,	$3,297 30	
Loans paid,	4,800 00	
Due last settlement,	256 22	
Rents,	750 00	
Executive Committee,	1,787 35	
Printing and advertising,	473 65	
Premiums, 1885,	12,150 85	
Premiums, 1884,	95 00	
Essays,	110 00	
Police, watchmen, &c.,	2,216 05	
Forage,	600 00	
Watchman, grounds,	454 42	
Preparation of grounds,	2,397 81	
Postage and telegrams,	608 46	
Superintendents and assistants,	1,629 46	
Labor,	2,084 17	
G. & E. Barrett,	100 00	
Music,	975 00	
Secretary's office,	953 90	
Secretary's salary,	1,060 58	
Treasurer's salary,	500 00	
Treasurer's office,	351 31	
Transportation,	627 72	
Stilemen,	1,003 50	
Permanent improvements,	16,251 15	
Balance,	75 54	
		$55,609 54

The question being upon the adoption or rejection of the report of the committee, it was moved by Mr. **KELLER**, seconded by Mr. **LANDRETH**, that it be adopted.

Mr. **MACKEY**. I do not know whether I am in order now, because the matter to which I refer is outside of the correctness of that report. While the report is before us, I would state the committee found the accounts of the Treasurer correct so far as they go, and also the vouchers for all the expenditures; but the committee would recommend to the officers of the Society and the Committee of Arrangements a reduction of the expenses of the Executive Committee. Those expenses, last year, were one thousand seven hundred and eighty-seven dollars and eighty-five cents. These are outside of the salaries of the officers, and immediately outside the charge of the managers of the affairs of this Society. We think there could be a reduction in that account. We further think that the charge for the police force, which was some two thousand four hundred dollars, might be reduced not less than one thousand four hundred dollars. We think there was entirely too much money expended for the police force on the grounds.

We think, also, the charge for music extravagant. We further find a large number of bills paid to newspaper men for noticing the Society and its transactions. I know, in my own town, we had, for two or three days, articles in the daily papers noticing the State fair, and I doubt very much whether any charges were made outside of Philadelphia for printing these newspaper reports.

There is another item relative to the police force. The committee think the giving out of dinner tickets to the amount of seven hundred or eight hundred dollars should be abandoned. These tickets are given out in good faith, but not used always in the interest of the Society. We should economize, I think, in the police department on the dinner tickets, and music.

But there is another matter. This Society has been in existence for thirty years or more, yet we have no books showing the transactions of the Society, or the accounts of the Society, except the Treasurer's books. It has been my idea that all well-regulated societies should have books showing the workings of the society, and its accounts, outside of the treasurer's books. I think there was reference made to that in the report of the President—that there should be books kept by the Secretary of the Society, or a book-keeper employed, so as to show the accounts independent of the Treasurer's. I desire to have this done, so that the transactions of the Society can be preserved for as many years as we exist. With these remarks, I submit the report.

The CHAIRMAN (Mr. NEIMAN.) The Chair has permitted Mr. Mackey to make those statements outside of the report of the committee. The matter to which he refers is certainly a matter for the consideration of the Society, and, when brought up as a separate matter, the Chair, of course, will entertain it. The question before the meeting now is, as I understand it, the adoption or the rejection of this report, and that only.

The motion to receive and approve the report, was unanimously agreed to.

Mr. KELLER. I would make a suggestion: I believe our officers—especially the Secretaries and clerks—have arduous duties to perform; but they are paid for their services, one receiving two thousand and another one thousand dollars per annum.

Chairman NEIMAN. There is nothing before the meeting. If the gentleman has a motion to make, the Chair will be pleased to hear it, and any discussion upon it.

Mr. KELLER. I believe that amount ought to be reduced about one fourth.

Mr. MACKEY. For the purpose of bringing up the matter to which I have referred, I move that the Secretaries of this Society be requested to prepare and have opened books, showing the transactions of this Society from this day forward, and as far back as they conveniently can go, say, 1884.

The motion was seconded by Mr. BARTO.

Mr. NEIMAN. So that, in the future, any person who has a right to see and know, can refer to the books of the Society and see its condition.

President WILHELM. I believe that it is customary, or, whether customary or not, it generally is the sense, that the duties of a corporation are put upon its "chief"—is that what you call it?

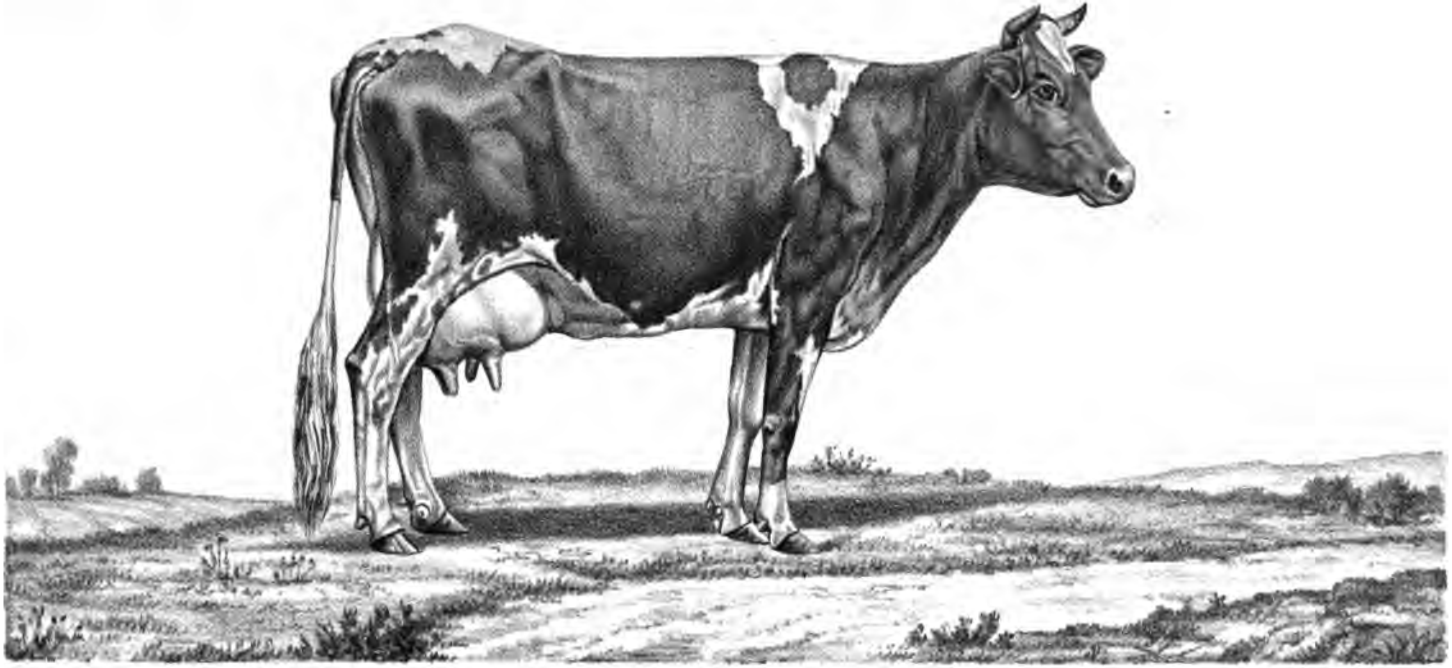
Dr. KENNEDY. Oh, yes; so good a chief as we have now. (Laughter and applause.)

President WILHELM. I will state—and I am very much obliged to Mr. Mackey for his suggestion—I would state for the information of the Society, that I was not aware until the latter part of the year that this Society, an active corporation, kept any books of business or of its accounts. I was amazed—no reflection now upon any person—but I was amazed that it had not been done. I doubt if there is a corporation of its length of existence in the Commonwealth of Pennsylvania, chartered by the Legislature, that has kept no accounts of its business. I consider, gentlemen, as a business matter, this Society should have a set of books in the custody of your Recording Secretary, which should show every item of its transactions. When I brought this matter to the notice of the Committee of Arrangements, I found that they were in blissful ignorance, as I was, that no such accounts were kept; but they passed a proper resolution immediately that the Secretary have the proper books prepared, showing the business transactions of the Society, as near as possible, during the years 1884 and 1885. Now, it is highly important that accounts should be kept, showing what everybody has done, so that any member of the Society coming in here and asking, "What was the amount of cost?" "Where is your account to show it?" "Give us what your entrance fees were," would not have a reply, "No account to show it." "Where is your rental?" "No account to show it." Your Treasurer keeps an account of the receipts and disbursements; but there have been no books. I am pleased to inform the Society that the Secretary of your body has, in accordance with the request of the Committee of Arrangements, procured books and opened accounts.

Now, in reference to the departments, the police-station, and so on, I must confess you know that, as a farmer, I do not understand this thing, and do not say I do yet. I did not examine this ticket until a moment ago, (referring to the printed ticket with the names of candidates for the various officers thereon.) I find my name at the head. If I had known that, I would have declined, and have a person elected who could discharge the duties much better than I have or can do; but I will admit that these charges can be reduced.

Chairman NEIMAN. The matter under discussion is on the motion of Mr. Mackey, providing for the opening of books.

Mr. MACKEY. Suppose I add to the motion, and to consider the recommendation made by the committee as to the reduction of the expenses?



IMP. ROSALIE, OF WALNUT GROVE,

Owned by J. W. Fuller, Catasaqua, Pa.

Secretary **SEILER**. Why not refer that to the next Committee of Arrangements? They will have full control over all expenditures of money.

Mr. **MACKEY**. This suggestion came as a recommendation from the committee.

Chairman **NEIMAN**. In the motion, the gentleman from Clinton embraced only one particular, and that is the question that is now before the meeting.

President **WILHELM**. I move that the gentleman be allowed to amend it.

(There being no objection,)

Mr. **MACKEY**. And that the Committee of Arrangements be requested to reduce the expenses in reference to the music, the Executive Committee, police force, and abandon the practice of issuing dinner tickets.

Chairman **NEIMAN**. I am very happy that the gentleman has left out the matter of printing.

Mr. **MACKEY**. I am reminded now that the chairman is a printer.

President **WILHELM**. I am fully in accord with the recommendation of that committee. I congratulate this Society upon the appointment of that committee, and having it come in with a recommendation of that character. I am fully in accord with them, and believe the expenses can be largely reduced. For the information of this Society, I have paid my own expenses and hotel bills, and my telegrams relating to this Society, but I think it is doing too much. However, the item of music should be reduced fifty per cent., and I have no doubt it can be.

Secretary **SEILER**. We had a three weeks' exhibition, and the band was kept that long, and also at night, causing an expense for the music that length of time and at night, until they were dismissed. The police, owing to a three weeks' exhibition, cost that much more. As to the dinner tickets, I can explain a portion of that. The mayor of the city furnished us with twenty-one uniformed policemen, to receive two meals each day. They did not put in an appearance until eleven o'clock in the morning, and took their dinner with us.

Chairman **NEIMAN**. This discussion is slightly irrelevant, as we propose to refer this to the Committee of Arrangements. The matter being discussed goes to them.

On the question before the Society, that the Secretary thereof be requested to prepare and have opened books showing the transactions of the Society from this day on, and as far back as they conveniently can—say from 1884—and that the new Committee of Arrangements be instructed to reduce the cost of music and police, and abandon the dinner tickets, and also to reduce the expenses of the Executive Committee. The question being put, it was adopted.

Mr. **LANDRETH** offered the following resolution:

Resolved, That the President of this Society this day elected shall appoint a Committee of Arrangements, the same to be composed of members of the Executive Committee, and residents of the city of Philadelphia and vicinity, members of the Society, which committee shall have and is hereby invested with full power and control over the next annual exhibition of the Society and all matters antecedent thereto, each member of which shall be entitled to an equal vote and voice in the direction of affairs.

Secretary **SEILER**. This is a meeting of the Society, and that will probably go before the new Executive Committee.

Mr. McCONKEY. No; I beg your pardon.

The motion was seconded by Mr. McKEAN.

Mr. LANDRETH. The idea of leaving the number blank is that the number be appointed according to his best judgment after consultation with his friends; that if, on some future occasion, the name of some individual should be considered to be an advantage, or considered to be very desirable on that committee, that he have power to appoint then, and here and there subsequently to the appointment of the general committee, to increase its strength. If the number were eight or ten, and the appointments were all filled, that he would have power to add to those eligible persons whose names might be brought forward, and the Society otherwise lose their valuable assistance.

Mr. MILES. Do I understand them to be the only active Executive Committee?

Chairman NEIMAN. The only Committee of Arrangements, the same as last year.

Mr. MILES. Why is it necessary to appoint that committee from around Philadelphia?

Mr. LANDRETH. That is not provided for.

Mr. MILES. Why not give him power to appoint throughout the State? This is not a Philadelphia Society, but a State Society. I say the President should be unhampered.

Mr. LANDRETH. What is desired is to have an increased number of farmers in Philadelphia and vicinity who can be called on in twenty-four hours' notice, or six hours' notice. To have the gentlemen residing in other parts of the State, they cannot come sometimes as soon as desired. By the adoption of this resolution, we can have a working force near the city.

Mr. MILES. It is perfectly proper to have such a committee, but I do not see the necessity of hampering the President from appointing members from anywhere else, if he finds good men in other parts of the State.

Chairman NEIMAN. That is covered by the resolution.

Secretary McCONKEY. That has been carefully drawn, and gives to the President all the powers that are necessary. It says "Philadelphia and vicinity." The object is to have a certain number of the business men of Philadelphia and vicinity in it. This gives the appointment of the committee to the discretion of the President. I have no doubt that in making up this committee the President will consult all sections of the State geographically, so they can be represented.

Mr. MILES. I think it should be without the word "Philadelphia."

Mr. BRANSON. I move to strike out "Philadelphia."

Secretary SEILER. Why not say "Philadelphia and elsewhere?'

The resolution was again read.

Mr. KELLER. I do not understand that it is incumbent upon him at all.

Mr. McKEAN. I think that covers the ground fully enough.

The resolution was adopted without a dissenting voice.

President WILHELM. Before the report of the tellers, I call for the reading of the latter clause of your late President's report. I do this because I wish to call the attention of this Society to the matter contained therein.

It was read.

Secretary SEILER. It has been suggested that we make some change. I do not know whether we can under the constitution, though I think the Constitution gives us the power. I think there can be no objection to the appointment of a clerk or anybody to assist the Secretary, if so wished by the Committee of Arrangements.

Mr. MACKEY. I move that the President of the Society be authorized to appoint a clerk and fix a salary, to assist the Secretary in the discharge of the duties of that department.

The motion was seconded by Mr. MCKEAN.

President WILHELM. I would suggest that the appointment be made by the President, with the approval of the Committee of Arrangements.

The amendment was accepted, and the motion, as amended, was agreed to.

Mr. LANDRETH. I would move that two new offices be created—that of Assistant Treasurer, and that of the Society's Reporter.

Chairman NEIMAN. That would be creating a new office, which, under the Constitution, we cannot do without giving three months' previous notice.

Mr. LANDRETH. If necessary, I will do so now—give the notice.

Chairman NEIMAN. The Chair will read the section of the Constitution covering this point: "The officers of this Society shall be a President, Vice President from each congressional district—three fourths of whom shall be practical agriculturists or horticulturists—a Treasurer, a Corresponding Secretary, a Recording Secretary, a Librarian, and Agricultural Chemist and Geologist, and such assistants as the Society may find essential to the transaction of its business; an Executive Committee consisting of the above-named officers, five additional members, with the ex-Presidents of the Society." Now, the proposition of the gentleman from Philadelphia may be covered by the expression, "And such assistants as the Society may find essential to the transaction of its business." But, if the gentleman would create a new office, or new officer, then the Chair is under the impression that he would have to be elected on a ticket the same as we elected the other officers. It is certainly creating a new office. The Constitution further says: "The Society shall meet annually, on the third Wednesday of January, at Harrisburg, when all the officers of the Society, not otherwise appointed, shall be elected by ballot for the ensuing year, and until another election. They shall also hold a general meeting at the time of the annual exhibitions," &c. Now, if you create a new office, then the man to fill it will have to be elected the same as we elected the President and other officers of the Society.

Mr. MACKEY. Is the question before the Society now? The motion has been seconded, has it?

Chairman NEIMAN. Yes, sir.

Mr. MACKEY. The Treasurer himself has a clerk. He has had him for years, and he has proved to be a faithful and competent officer. It would be unwise, I think, and it would not be doing justice to the Society, to appoint an assistant for him without consulting with him who should be the man.

Mr. LANDRETH. The object is to make him an official, by his consent.

Mr. MACKEY. The Board might not always do that, I think.

Chairman NEIMAN. The Chair withdraws his ruling upon the first question, that it would be creating a new office, but he insists that we cannot elect such officer without opening the poles again and proceeding to a ballot.

Mr. KIRKPATRICK. Then let it go over.

Chairman NEIMAN. It will, if the meeting does not take exceptions to the ruling of the Chair.

Mr. MACKEY. There is no appeal taken.

Secretary SEILER. I think, in the matter of official reporter, the Society might select one. There is no objection to the offering of a resolution of that kind.

Mr. MACKEY. What do you gain by it? The Treasurer selects his officer for the present, at any rate, if he chooses.

Secretary SEILER. Colonel Demming is the official reporter of the State Board, and many other organizations, and a very efficient gentleman in that direction. I would move that he be the official reporter of this Society.

President WILHELM. I second the motion. (Messrs. Kirkpatrick and Keller also arose to second the motion.)

Chairman NEIMAN. It is creating a new office, and the Chair must rule that we cannot create a new office in that way. If the judgment of the Society is otherwise, the Chair would be very ready to hear an appeal.

Mr. MACKEY. I move that the ruling and decision of the Chair be approved.

Chairman NEIMAN. It is not necessary, unless an appeal be taken.

President WILHELM. I would ask, Mr. Chairman, whether the members of this Society are not the principals of it?

Chairman NEIMAN. I answer that they are, but they are governed by the Constitution.

President WILHELM. But have they no right to elect an official reporter?

Chairman NEIMAN. When they do that, they create an office not contemplated by the Constitution as it now stands, and therefore you would have to give the necessary notice. The Chair seems to be clear in his own mind on that point.

President WILHELM. Do I infer from that that the Society has been violating any rule or its charter? It has employed this gentleman from time to time.

Mr. MILES. The Chair says as an official.

President WILHELM. I move that the Constitution be amended, and I give notice.

Chairman NEIMAN. The Chair does not consider that he has made a mistake, but he may have. The Chair has given an opinion, which has been acknowledged as authority in some quarters of the State.

Mr. JAMISON. Is there any reason why the Committee of Arrangements cannot employ the services of this gentleman, if they, in their wisdom, deem it proper for the best interests of the Society?

Secretary McCONKEY. There is nothing prohibitory in that; but they cannot give him an official rank.

Chairman NEIMAN. The Committee of Arrangements can secure the services, and they can incur any expense in that direction, but that is different from creating an office.

Mr. KIRKPATRICK. Is there anything to prevent electing an officer of that kind at the next quarterly meeting?

Chairman NEIMAN. Mr. Wilhelm now gives notice that he will, at the next meeting, offer an amendment to the Constitution providing for the election of this officer.

The judges and tellers appointed to conduct the election of officers for the ensuing year, made report as follows:

Whole number of votes cast, 64.

President.

A. Wilhelm had . . . . 64 votes.

First Vice President..

W. M. Singerly had . . . . 64 votes.

Vice Presidents.

George Blight	had	64	votes.
L. H. Twaddell	"	64	"
Joseph E. Gillingham	"	64	"
W. M. Singerly	"	64	"
Burnet Landreth	"	64	"
David H. Branson	"	64	"
William H. Holstein	"	64	"
Tobias Barto	"	64	"
B. J. McGrann	"	64	"
Daniel H. Neiman	"	64	"
D. J. Waller,	"	64	"
Ira Tripp	"	64	"
J. S. Keller	"	64	"
Gabriel Hiester	"	64	"
Joseph Piollet	"	64	"
R. J. C. Walker	"	64	"
John A. Lemon	"	64	"
John S. Miller	"	64	"
Chauncey F. Black	"	64	"
L. A. Mackey	"	64	"
George Rhey	"	64	"
F. Y. Clopper	"	64	"
W. W. Speer	"	64	"
John McDowell	"	64	"
J. S. McKean	"	64	"
J. D. Kirkpatrick	"	64	"
J. C. Thornton	"	64	"

At Large.

J. A. Paxson had . . . . 64 votes.

Additional Members Executive Committee.

Abner Rutherford	had	64	votes.
William Taylor	"	64	"
John H. Ziegler	"	64	"
Jefferson Shaner	"	64	"
Cyrus Chambers, Jr.,	"	64	"

Ex-Presidents—Members of the Board.

Frederick Watts	had	64	votes.
D. Taggart	"	64	"
Jacob S. Haldeman	"	64	"
James Miles	"	64	"

Corresponding Secretary.

Elbridge McConkey had . . . . 64 votes.

Recording Secretary.

D. W. Seiler had . . . . 64 votes.

Treasurer.

John B. Rutherford had . . . . 64 votes.

Chemist and Geologist.

A. L. Kennedy had . . . . 64 votes.

Librarian.

William H. Egle had . . . . 64 votes.

Chairman Neiman (to Mr. Wilhelm.) It is my pleasant duty to again announce to you that you have been unanimously elected the President of the Pennsylvania State Agricultural Society. I trust you will receive the election in the same spirit in which it has been so decidedly manifested. That your duties for the past year have been of the most onerous and laborious character, we are all too well aware. That you have discharged them with fidelity, and that you have given your time and money to the interests of the Society, we all well know. We trust that the little cloud that now hovers over us may be speedily dispelled, and that, when we meet here a year hence, with you at our head, it will be under the broad sunlight of independence and success. (Applause.)

Mr. Wilhelm. Mr. Chairman: You made a good beginning; I am sorry you did not go on and finish, because I am sure you can do it so much better than I can. But, gentlemen, I must say that while I was in great hopes—and I declined to serve again, or to be a candidate, in the most positive and emphatic terms—yet, when the office comes to me as this has done, without a dissenting vote, and after following this Society through a few years of sunshine, I do not propose now to shrink from it in the storm. (Applause.) And with your assistance, gentlemen, and the assistance and coöperation of my good friend from Philadelphia, (Dr. Kennedy,) I am certain that this Society is going to be one of the grandest successes that you have ever known. (Applause.)

Dr. Kennedy. Allow me to conduct the President to the chair.

(It was done.)

Mr. Mackey. I desire to make a personal inquiry: By what authority does this Society elect a double-headed Vice President? William M. Singerly is elected First Vice President and also Vice President.

Secretary McConkey. There is an amendment in the new Constitution adopted, but not printed yet.

Mr. Mackey. I can find that one is eligible from each Congressional district.

Chairman Neiman. Was the First Vice President present at the last annual meeting?

Mr. Mackey. I think not.

Secretary McConkey. The First Vice President is placed next to the head of the ticket as simply designating who shall be the President's successor in case of his resignation or death.

Dr. KENNEDY. I would ask the attention of the Society to a little matter which, perhaps, is of considerable importance, and which it is my duty to bring before you, I suppose. It is in connection with the diffusion of the knowledge of agriculture among the people. As the chemist of the Society, I frequently go into communities, and have been going for the last year—that is, of course, outside of Philadelphia—for the purpose of talking to them on the subject of what might be called the principles of agriculture; and I feel as though the cause was very weak—that something more should be done than is now done to promote it. This conviction has become painful, and I should like the attention of the members to this subject, which is not, of course, a very grand affair in itself, but in its results. It would surprise the members of the Executive Committee if I would tell them some facts in regard to the ignorance which I have found prevailing as to recognized principles and ideas among the people—among the farmers—among the grangers—and I have been moved to think perhaps this might be remedied if some way were devised for diffusing information on agricultural topics through the district schools. You are probably aware that in some parts of the world the school-system provides that an agricultural instructor shall visit certain districts, call up the advanced pupils, and there give them a brief lecture on the subject of farming. This is the case in Germany. But I do not propose that that should be done in this country, or this State, but I am about to offer a resolution. I know that the Chairman may call me to order if he chooses to, but he is very kind-hearted, and I propose to offer the resolution, which, by the way, will explain itself. We cannot do what Germany does—at least we do not propose to now—but this we can do: we can cause the pupils of normal schools to know something of agriculture through the instruction given there, and I propose to feel the community on this subject:

WHEREAS, Agriculture would be more rapidly improved were the public-school teachers settled in rural districts competent to give information as to the best methods of farming, and the reasons therefor; therefore,

Be it resolved, That the State Department of Education and the authorities of State Normal schools be, and they are hereby, requested to make provision for the delivery of courses on the principles and practice of agriculture before the advanced classes of said schools, in order to fit their graduates to diffuse a knowledge of enlightened husbandry among the pupils of the district schools in the communities in which they may be located.

Chairman NIEMAN. Unless otherwise directed by the meeting, the Chair will refer the preamble and resolution to the Executive Committee for consideration.

Dr. KENNEDY. I have no objection.

Mr. RUTHERFORD moved that the meeting of the Executive Committee take place immediately after the adjournment of the Society.

The motion was seconded and agreed to.

Chairman NEIMAN. Before adjourning, the Chair desires to state that he has noticed the interest, not only of members of the Executive Committee, but of the Society generally, in the somewhat animated discussions that were had before the meeting. He returns thanks to the gentlemen for the kind and courteous treatment received at their hands as their presiding officer, and hopes that the interest manifested to-day will continue, not only throughout the day, but throughout the year.

It was announced that the Executive Committee would meet at two o'clock, P. M., whereupon, at fifty minutes after twelve o'clock, P. M., the Society adjourned.

EXECUTIVE COMMITTEE.

The new Executive Committee of the State Agricultural Society met at twenty minutes after two o'clock, P. M., Wednesday, January 20, 1886, President Wilhelm in the chair.

Secretary SEILER moved that a committee of three be appointed to take charge of the printing for the coming year.

The motion was seconded by Mr. MILES and agreed to.

Secretary SEILER. I have a letter from Mr. Barker. I think he is the secretary of the dairy or cheese association of Philadelphia, and they have tried to have the meeting of the International Society held at Philadelphia during the exhibition of this Society there. I move that the letter be referred to the Committee on Arrangements.

The motion was seconded by Dr. KENNEDY, and agreed to.

Secretary SEILER. I have also a communication suggesting a change in premiums, as suggested by Mr. Horner of New Jersey, more particularly relative to the grapes.

On motion of Secretary SEILER, seconded by Mr. MILES, it was also referred to the Committee on Arrangements.

Dr. KENNEDY. I think that our Society, so far as our transactions go, does too little, for the work is all done by the Executive Committee. Members, of course, are entitled to their opinion on the subject, but I think the more business of importance we can have transacted by the Society the better it appears in our transactions, although it is perfectly right and proper to refer matters to this committee. I explained this morning something on the diffusion of agriculture, and it is for members to state how we shall advance in the knowledge of agriculture by application in a practical way. What is the need of agriculture now? The principle is a very good one, but application is what is wanted. I call up the preamble and resolution—

WHEREAS, Agriculture would be more rapidly improved were the public-school teachers settled in rural districts competent to give information as to the best methods of farming, and the reasons therefor; therefore,

Be it resolved, That the State Department of Education, and the authorities of State normal schools be, and they are hereby, requested to make provision for the delivery of courses of lectures on the principles and practice of agriculture before the advanced classes in such schools, in order that the graduates may be fitted to diffuse a knowledge of enlightened husbandry among the pupils of the district schools in the community in which they may be located.

I move the adoption of the foregoing preamble and resolution.

The motion was seconded by Mr. KIRKPATRICK.

Dr. KENNEDY. I should like to say, as I remarked before the Society, that we are all of us puzzled to know what is the best way to advance agriculture. We have societies of all kinds, and they are doing a world of good. There is not one that can be dispensed with; but the question is whether there have not been other agencies, which have not been in vogue in this country, which have been in vogue abroad, and the question is whether we can have persons in various parts of the country competent to answer questions. It is not proposed that the teachers in these public schools shall have lectures, or have other exercises, but that they may be competent to answer questions on agriculture. There are more questions coming up requiring solution in the practice of agriculture than in any other calling. Now, how can these questions be answered, and intelligently enough to pursue? They are answered by the press and at meetings of the Society. But there are others that come up that ought to be answered on the spot, if possible—questions which come up at the breakfast table, and answers to which the little folks could carry home if answered by a teacher competent to do it. Agriculture is profitable, and we ought to make it an intelligent pursuit. There are those at home who do not know technically much about it, and, with these questions answered, they might know very much more. There are questions pertaining to agriculture of a subsidiary character, as entymology and botany, and the kindred branches. Now, the question is how to do it, unless by the normal schools, of which we have twelve; that one or more of them shall provide that the graduating class, or advanced class, shall be required to hear a lecture on "Agriculture" from parties whom they could select. In most schools they have laboratories, and that will prompt them to fulfill that which is contemplated by this resolution. The resolution covers, you will see, a recommendation; and, if it is approved, then, of course, it will be in order to appoint a committee in connection with it, and it may be brought before the next Legislature. I cannot see any objection to it. I do not want this Society to be anticipated by any other organization of whatever name it might be. I think people are casting around to get agriculture advanced, and the new schemes being devised promise to be valuable, though not covering everything. I ask that the resolution be approved.

Mr. KIRKPATRICK. As I am from a decidedly rural or agricultural district, I think I am competent to make a suggestion to my old friend, the doctor.

Dr. KENNEDY. No doubt about it.

Mr. KIRKPATRICK. He speaks of the normal schools. Not one out of one hundred of my agricultural friends so far advance as to attend a normal school.

Dr. KENNEDY. That may be.

Mr. KIRKPATRICK. Hadn't we better have that substituted for hygiene? It may be it will do more good.

Dr. KENNEDY. But we could not do that.

Mr. KIRKPATRICK. But a farmer's boy never reaches a normal school.

Dr. KENNEDY. I have a friend who has two daughters at the State normal school.

Mr. BRANSON. I do not rise to object to the resolution at all. I would simply say that, especially in the rural districts, the schools are taught—we may say, nine tenths of them—by young ladies. The boys at the schools are farmers' sons, and they are glad to get away from the farm to get a little recreation at school. I do not know how we can induce them to study agricultural subjects, or how it could be done. They get about as much practical agriculture as they want after they get home from school, or about as much as they are willing to take, and there is more than a little left for some other day. But it seems to me it would be well if we could establish something of that kind. In our county we have a number of agricultural societies—clubs, if you please. One of these has met monthly for twenty-five years—the Octoraro Farmers' Club—and during the twenty-five years but few sessions have been omitted. Monthly they have met at the homes of farmers belonging to the organization, and agricultural topics have come up at those meetings. They have been very interesting. Throughout the county there are other agricultural organizations that meet monthly, and sometimes more frequently, and they are having a good effect. All the improvements in agriculture are being discussed at this time. Whilst I fully appreciate the doctor's preamble and resolution as facing in the right direction, yet I doubt whether we can have any more subjects introduced into our public schools than we have now.

Dr. KENNEDY. I do not propose to have a course in our common schools, but that teachers be able to answer questions as they come up.

Mr. BRANSON. It would require an act of Assembly.

Dr. KENNEDY. Yes, sir; this does not propose to make any change at all in the studies of the district schools. You add to the advanced classes in the normal schools the duty of having this subject presented or illustrated, but it is left entirely to the authorities—this subject of lectures on the principles and practice of agriculture. It would help female teachers who come out to be more able to answer the questions in regard to insects, say, and other matters pertaining to agriculture, and upon which they know nothing now. I believe this will be done eventually.

The Chairman requests me to say, instead of request, "solicited," and I accept the amendment.

Mr. KIRKPATRICK. We have in our text-books theories that are not the one one-thousandth part as important as you recommend. Why not substitute this for one of them?

Dr. KENNEDY. I would like to have that done.

Mr. KIRKPATRICK. You know what I say is the fact.

Dr. KENNEDY. Yes; but let us do what we can.

Mr. KIRKPATRICK. Let it be made part of our text-books. It would be better than some cock and bull story that never happened.

Dr. KENNEDY. I perfectly agree with the gentleman. I have worried over that many a time.

Mr. LANDRETH. This proposition from Dr. Kennedy, I think, is a very practical one. I think it is a part of the duty of this Society to do something else than to hold an annual exhibition once a year at Philadelphia or some other place. Let this Society go forward and show that we are endeavoring to do something for agriculture in general. As Dr. Kennedy remarked, if we do not, some other organization will. The State Board is doing that. This is a good starting-point, and it is something tangible to start on. I have been in foreign lands, and some little in Germany, and this subject of which Dr. Kennedy speaks is not a new one in that country. Agriculture is taught in the schools by a traveling teacher in the employ of the Agricultural Bureau or Department, and he visits the schools probably once a month. He is an expert, and he can tell the why and the wherefore for the procedure. He lectures to the children and sets them to thinking, and illustrates, and gives information to them that they could not get at home, and which they could not get here. He is in the pay of the government, as a traveling professor, and they look with pleasure for his visits. He never comes and goes without leaving valuable truths behind. That can be done here, and in the normal schools, as Dr. Kennedy suggests.

The preamble and resolution were adopted without a dissenting voice.

Dr. KENNEDY offered the following resolution:

"*Resolved*, That a committee be appointed to urge the measure contemplated in the preamble and resolution just adopted upon the attention of the authorities and others therein named, and prepare a circular petition in favor of the measure, and have the same laid before the Legislature, for action at the next meeting of that body."

Mr. KIRKPATRICK moved the resolution be adopted, which was seconded by Mr. Keller and agreed to, it being understood, upon inquiry by the Chair, that the President should appoint the committee, to consist of three members of the Society.

Mr. KIRKPATRICK. I beg the time of the house from two and a half to four minutes only. It seems like a forlorn hope that brings me up. Somewhere, and by somebody, an effort must be originated to save the "one horse"—I will use the slang phrase—to save the "one horse" agriculturist from going under—for he is going under now. This will involve a political question. I don't know what else it will involve, but it does involve his bread and butter. With wool at twenty-five cents, and wheat at seventy-five cents, the small-fisted farmer, who has twenty-five to seventy-five acres of land, cannot live. I say so, and I know it. It is pretty strong talk, but, gentlemen, I am telling what I believe to be the fact. Wait, you cannot long; and there is no reasonable means by which you can reach it. Now, we are an agricultural society. Our aims and objects are to benefit agriculture. If we can keep a portion of it from starving, to do so there will be considerable benefit. I can tell you that with the rates the small-fisted farmer is receiving to-day for his wool, and wheat, and his apples, and all that sort of thing, he cannot live.

The PRESIDENT. Why not offer a resolution?

Mr. KIRKPATRICK. Somebody, I hope, will. It is in despair that I say this, to help others out. I think I can get out myself, but I think there are thousands and thousands who cannot.

The PRESIDENT. I think a resolution to increase the duty on foreign wool would aid you, but then I see, by this morning's paper, an announcement of one of the largest deals in wheat in the United States. It is predicted that wheat will be one dollar and thirty cents within a few weeks.

Mr. LANDRETH. Wheat is thirty cents cheaper in Liverpool than in New York.

Mr. KIRKPATRICK. But you can reach that.

Secretary SEILER. Wheat is a western product, and you cannot compete with them.

Mr. KIRKPATRICK. Yes, sir; but I have sold the wool from a thousand-dollar sheep at twenty-six cents—hundred-dollar ewes and thousand-dollar bucks. As my friend says, I live in the region of natural gas. But this thing must start somewhere by somebody, and I tell you, gentlemen, it is grinding them down, and they are feeling it terribly. Our apple crop in western Pennsylvania realized thirteen to fifteen cents a bushel for the choicest apples. Wool is the only thing we can reach—western Pennsylvania is a wool-growing country. As in eastern Ohio and western New York, we have a large area there. I ask for somebody to offer a resolution, and, if any one is not ready, I will.

Mr. MILES. I think it is a little like a gentleman who died after making a will. He willed that his family should have so and so, but there was nothing to pay.

Mr. KIRKPATRICK. I offer the following resolution: That a committee of three be appointed to endeavor to devise ways and means to reach the powers that be—it can only be done politically—to put a tariff upon the importation of raw wools. The manufacturing country have taken care of themselves.

The PRESIDENT. They protect themselves.

Mr. KIRKPATRICK. They protected themselves, but not us.

The resolution was seconded by Mr. KELLER.

Mr. MACKEY. I move to amend by adding that the Pennsylvania State Agricultural Society is not a charitable institution. It may be not germane.

Mr. MILES. Hadn't we better include in that iron and coal?

Mr. KIRKPATRICK. No, sir; they are taking care of themselves.

Mr. NEIMAN. In my county that is simply ridiculous. This Society cannot regulate supply and demand, or prices. I therefore move to lay the matter on the table. It is a matter we cannot help, and it would be improper for us to attempt anything here.

The motion to lay upon the table was seconded and agreed to.

Mr. KIRKPATRICK. Well, I think I can get out myself on natural gas.

Mr. NIEMAN. Mr. President: I am authorized by the secretary of the State Grange of Patrons of Husbandry to invite you, and through you the members of the Executive Committee, to attend the annual exhibition of the State Grange at Williams Grove on the first of September next. The invitation is cordially extended by the secretary of the association.

Secretary SEILER. I move that the invitation be acknowledged with the thanks of the Society.

President WILHELM. And to extend an invitation to hold their next meeting of the Grange on the grounds of the Pennsylvania State Agricultural Society.

Seconded by Mr. KIRKPATRICK, and agreed to.

Mr. NIEMAN. I move that the Executive Committee do now adjourn.

The motion having been seconded,

President WILHELM. I wish to thank you, gentlemen, for your careful attention. I hope that our next meeting will be under more encouraging circumstances, and that all our meetings will be much larger. I would also throw out the suggestion that our public meetings be noticed through the press, and that a larger room be provided for a larger audience.

Dr. KENNEDY. We could then have regular exercises of interest and instruction to the public.

The motion before the Executive Committee was agreed to, and, at 2.55 o'clock, P. M., the committee adjourned.

METHODS BY WHICH THE DISTRICT SCHOOL MAY MOST EFFECTIVELY INCULCATE THE DUTY OF HUMANITY TO ANIMALS.

BY BELLE LAMAR STOCKBRIDGE.

There is a story told of Emperor William that, once in a public school which he visited, he catechised a little girl concerning the kingdom to which various objects he mentioned belonged. She classed correctly the stove, the orange, etc., and, finally, being asked by His Majesty to what kingdom she herself belonged, hesitated a moment, then answered:

"To God's kingdom, sire."

Yes; and shall we shame and dishonor our Creator and King by neglecting and ill-treating any one of our fellow subjects?

When we come to examine the subject carefully, we find that much of the abuse and neglect of animals spring from ignorance and curiosity on the part of children. They do not know that certain laws of sensibility and susceptibility govern all sentient creatures; and when they torture a frog or worm, they are not conscious of inflicting pain, but evince merely a lively curiosity, often amid screams of merriment, to "see what he will do when poked with a stick!" They would not so treat a helpless infant, because, an infant's body being fashioned like theirs, they know that an infant has similar feelings; and besides also, their young minds are often prejudiced by their elders; and the poison of contempt is added to ignorance and curiosity. They hear an older person say, "Kill it; it is only a worm!"

Only a worm! And man, too, is only a worm!

Those children whose faculties of observation have been judiciously trained eagerly make experiments themselves; and are introduced to the wonders of a new sphere when they discover that, in addition to physical sensibility, animals possess a nature keenly susceptible to mental emotions; and learning that their pets are as much injured by an angry word as by an angry blow, they unconsciously treat them with respect and consideration.

Animal life has a fascination for the child mind, and their names are the first words articulated after "papa" and "mamma." An infant will gaze, as if spell-bound, at a group of horses or a herd of cows; and is beside itself with joy when taken into an open carriage, or better still, in safe arms on horseback.

Let a man ride up to the gate on a fine horse, and the boys of the family forget their good manners to a guest in their eagerness to have a good look at the horse.

Note the excitement of children when a circus comes to town. And the majority of them are more interested in the menagerie than in the ring performance. How eagerly and enthusiastically they go around among the cages; and how minutely they question the keepers as to the habits and manners of their charges. How fascinated they are by the grotesque antics of the monkeys, and how quick to perceive their resemblance to human beings. How, for weeks after the exhibition, the average boy turns all his thoughts to the circus, and, besides the marvellous feats of the ring, reproduces the menagerie true to life; and tries to make his horse and dog act with the same intelligence as the trained animals of Barnum and Forepaugh.

Children brought up under the care of wise and gentle parents are themselves kind and considerate in their treatment of animals. Not, unhappily for the world, all are so fortunately placed; and to the teachers of the district school they look for the supplement to home influence and training.

Now, since the word *educate* is defined as meaning to "form and regulate the principles and character," and is supposed to furnish and fit the pupil for future usefulness in life, should not the curriculum of study embrace every branch of instruction that is to be called for in the later emergencies and responsibilities of manhood?

Not every boy will have need of an extended course in mathematics, or will find use for an intimate knowledge of Greek and Latin; and, indeed, it is not every boy who is susceptible of the advantages of a higher education; but every child of man will be brought into contact, more or less intimate, with the lower animals, even though those animals are nothing more than rats, and toads, and butterflies.

There is no book so fascinating as the book of nature, because no other book embraces so much variety, and is so easily accessible at all times; and few children will fail to be interested therein, provided the teacher wisely directs the inquiring mind, and, by his own enthusiasm, inspires the young observer. A man, famous in the world of letters, said a few years ago that there was now so little enthusiasm in the world. People had forgotten how to pronounce the word, but called it *en-thoo-si-ism*. We cannot inspire this happy emotion without possessing it ourselves; and the teacher who lacks it, who hears recitations merely for the sake of the dollars earned thereby, imposes upon his own nature, upon his employés, and betrays the sacred cause of teaching. Such a teacher would be a more honest man or woman engaged in some occupation which requires merely the uniform work of a machine.

During the past few years, there has been a change in innovation, in the curriculum of the district school, and children are now learning that "the proper study of mankind is man;" and rarely is the child to be seen who is not interested and awe-struck when he learns how "fearfully and wonderfully he is made." The introduction of *Physiology* into the required course of study marks an epoch in the history of common school education; and in the growing tendency to substitute the natural sciences for so much that has hitherto hindered the practical usefulness of instruction, hopeful eyes see, in the near future, the study of animals taking its proper place in the routine of school work. When *Comparative Anatomy* comes to be part of every child's studies, a new impulse will be given to his thoughts, and he will know then by demonstration that the lower animals are not, after all, so far below him in the scale of creation; and he will have a new appreciation of the declaration that God takes account of every sparrow that falls to the ground, and hears the young ravens when they cry.

At the present time, the teacher who assumes the duty of instruction in the study of the nature of animals, will have a difficult task, for there are few books of practical value on the subject, and no text-book. About ten years ago, the Massachusetts Society for the Prevention of Cruelty to Animals offered a prize of a thousand dollars ($1,000) for the juvenile story which should best embody the principals of the society; and since the story has had its beneficent effect, and public opinion is keenly awakened at last, it would be advantageous for some agricultural or educational society—indeed, it would be worthy of the notice and condescension of some State Legislature—to offer a prize for the best text-book on the nature of animals to be used in schools. Let this text-book be revised and corrected by a scientist who is a specialist, for care must be taken, while giving children pleasant and interesting work, that no errors are taught or wrong impression made, and many of the so-called elementary zoölogies are full of glaring misstatements; and teachers, at present, are too ill-informed and inexperienced to detect even serious mistakes.

As a preparation for his work, let the teacher devote himself conscientiously to study, research, and observation; and, as an encouragement to teaching, let teachers' institutes and teachers' conventions offer prizes to teachers for essays on themes relating to the subject of the nature of animals.

Until instructors arise who are competent to undertake the subject, let the school committee engage the services of a scientist, who shall give a course of lectures on the study; and, as an incentive to the zeal and enthusiasm of the students, let these lectures be public, and thus reach the ear of the community.

Decorate the walls of the school-room with photographs and engravings of the great masterpieces of animal life in art. What finer figure can meet the eye than Landseer's *Monarch of the Glen?* And what attention is not caught by the gravity and intelligence of *The Connoisseurs*, who look critically over their master's shoulder at the picture drawn upon the canvass? Rosa Bonheur's *Breton Oxen* are creatures instinct with life. Every child should be familiar with Thorwaldsen's majestic *Lion of Lucerne*; and photographs, and, perhaps, even copies in plaster, are to be had of Louis Barye's wonderful delineations. Pictures like these will serve to impress upon the indifferent mind the fact that the highest order of genius has employed itself in portraying the attitudes of animals and phases of animal life; and, while handsomely adorning, perhaps, hitherto bare walls, may fitly supersede the trite mottoes and time-worn saws which present themselves in gaudy colors and showy frames in so many of our school-rooms. Besides, they may sometimes aptly supplement the charts of *Comparative Anatomy.*

In the meantime, while waiting for the forthcoming of the model text-book, and, indeed, as a literary supplement to such a book when it has really come, the intelligent and sympathetic teacher may introduce the youthful mind to some of the great minds of literature. Let the teacher endeavor to win the attention of the boys from stories of sensational adventure; and the minds of the girls from the sentimental platitudes of sickly school-girl novels, and divert so much healthy energy into new and safe channels of thought. Great writers have celebrated in prose and verse the worth and beauty of the animal kingdom; and a course of reading from such authors would assist as a complement to the pictures on the wall.

On rainy, dark days, when lessons drag and minds are dull; on Friday afternoons; on all days after violent exercise at recess, when neither mind nor muscles are under control, let the teacher, or some boy or girl, read aloud from the rostrum something that will interest and entertain the school. The larger portion of the pupils will appreciate and enjoy the privilege; some there will be who will abuse the opportunity; but do not let that discourage the practice. We all know that if Christopher Columbus could come before a school-room full of pupils, there would be some who would pay no attention to the great man. This reading will not be lost on the attentive ears; and it is impossible to calculate the influence that may flow from a half hour—only a half hour—so spent every day.

Read first, and often reread, Cowper's lines, beginning—

> "I would not enter on my list of friends,
> Though graced with polished manners and fine sense,
> Yet wanting sensibility, the man
> Who needlessly sets foot upon a worm."

Many of Grimm's *Fairy Tales* and many of Hans Christian Anderson's stories treat of the characteristics and peculiarities of animals, and may be read with profit and interest. Read by one who can render the dialect, *Uncle Remus* would be a great treat. These stories are genuine compilations of negro philosophy concerning animals, and Joel Chandler Harris has happily transcribed the recollections that he possesses in common with other Southern children.* Do not omit from this reading those masterpieces of pathos and power:

Rab and His Friends, by Dr. John Brown, of Edinburgh; and the *Dog of Flanders*, by Ouida. Both of these can be easily found in any library in the series of *Little Classics*, in the volume entitled *Childhood.*

The writings of Scott, George Eliot, Bulwer, and other novelists abound in portrayals of animal life, especially of dogs.

Since it is the general custom of schools to have the pupils recite poems, it may be deemed advisable that such poems during one term, or even during one year, be such as treat of animal life. These will be found of great variety, illustrating many traits of character; some to be recited simply, others requiring great dramatic power for proper rendering. Bryant's *Waterfowl* and *Robert of Lincoln* are written in a most happy strain. Shelley, Wordsworth, and Hogg have all celebrated the sky lark; and Shelly's Ode is reckoned among the five great odes of the language. Every child will be deeply touched by the fate of Llewellyn's noble hound *Gilbert.*

These are some of the stories and poems which occur to me as having been of great help to me both as a pupil and as a teacher Such a course as is here indicated, if pursued with system, sympathy, and enthusiasm, will be productive of the best results for the moral and intellectual well-being of pupils. It will give them new ideas of the appreciation and regard in which animals have been held by famous men and women; and, by a pleasing introduction to the writings of the best authors, will give them a disgust for bad and sensational reading. A healthy reaction will set in; and they will place a new and higher value on their own natures.

For composition-work, I would suggest that subjects about animals be assigned; subjects on which the youngest as well as the oldest may write. The younger ones may be required to describe certain familiar animals, and tell what they know, from personal observation, of their habits and peculiarities, and relate some simple anecdote. The older pupils can take a broader and more serious view, and treat the subject from a metaphysical and historical stand-point, assigning the

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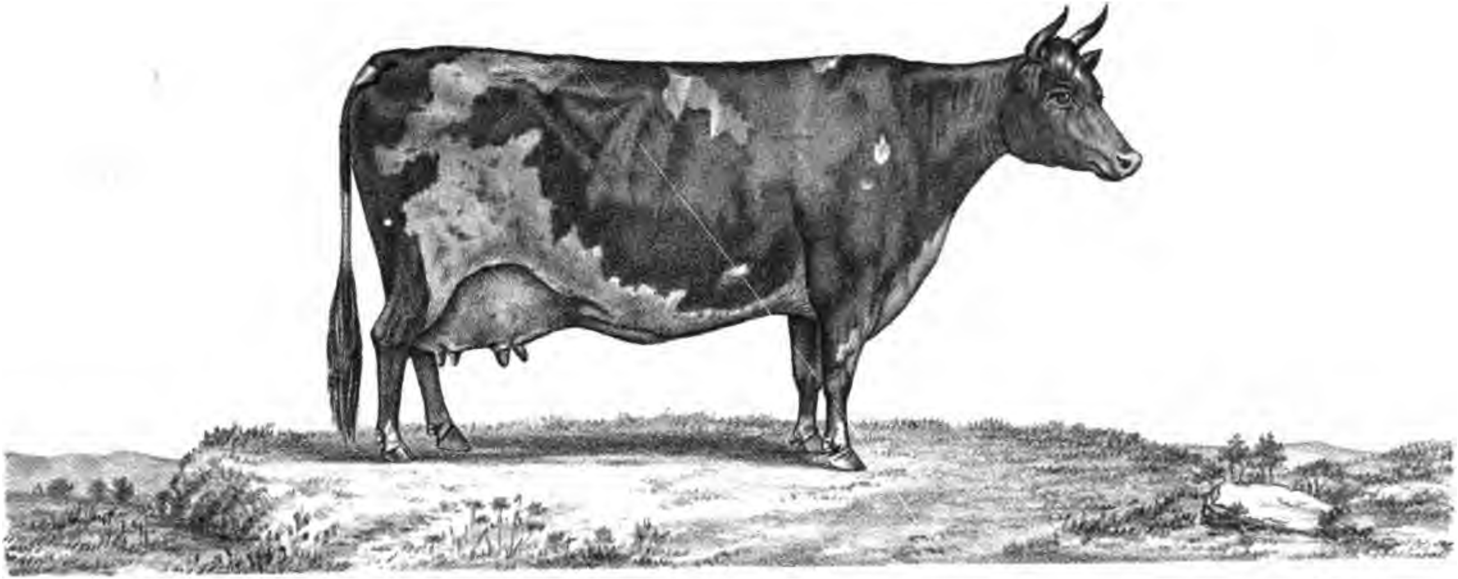
*It is a singular fact that in the folk-lore of the Japanese. there are ascribed to animals many of the attributes and peculiarities, and even some of the actions, that are described by *Uncle Remus.*



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animal its proper place in science, history, and literature. They may also discuss practical ways and means best adapted to secure their comfort and greatest usefulness.

These essays, if written, or copied after being corrected, in a book could be examined by a committee for awarding a prize, or kept as a means by which the pupil may judge of his progress in English composition, and of his growth in the knowledge of the nature of animals.

As a further incentive to the study, have a class make a compilation of *authentic* anecdotes of animals and birds and insects; and award a prize for the best collection. These anecdotes may be gathered from their own observation, or from experience of friends, or from newspapers, or from books.

Encourage them to have pets of their own, for whose care and comfort and training they may be solely responsible. In this way, they may make experiments independently; and add day by day to their knowledge of the many wonders to be found in animal life.

There are several periodicals published devoted to the interests of animals—*Our Dumb Animals*, published under the auspices of the Massachusetts Society for the Prevention of Cruelty to Animals, and the British publication, *Animal World*, being the most prominent; and besides the constant interest kept up in the strictly scientific journals, the leading magazines have, in every number. some of them accompanied by fine illustrations, an article on some phase of animal life, written by a standard writer. Let the teacher keep his pupils posted in this current literature, and thus enable them to realize the vital and growing interest in animals manifested every day by leading minds all over the world.

If deemed advisable by the teacher, appeal to the self-interest of pupils; and, by demonstrating the fact that animals are more tractable, and, hence, more useful, under kind treatment than under abuse, teach them that, if in their relations with human beings they find that "honesty is the best policy," their motto in their relations with dumb animals must be *humanity is the best policy.*

These methods for interesting and instructing children concerning the nature of animals are suggested to answer the needs of the present, when there are few teachers capable of taking up the scientific study. and when there is a lack of scientific aid to the study. The plan suggested is purely practical, and can be easily adopted, and with success by any school. And, at a later day, when the wished-for innovation has come, the course of proceeding here indicated will be found to serve admirably as an introduction to, and preparation for, advanced scientific instruction.

Animals were given us by a wise Creator for our service and pleasure; and in gratitude to Him we owe them our sympathy and protection. If, as has been shown, ignorance is the root of the evil in man's treatment of his dumb slaves, then it follows obviously that it is the duty of every enlightened state to overcome this ignorance, speedily and thoroughly; and in no way can this be done except by a study of the nature of animals, and an education of the child in the principles and practice of humanity and kindness; and in the knowledge that the Golden Rule of our conduct toward man applies equally to our conduct toward our *humbler friends.*

SAME FIELD.

EXPERIMENTS WITH LIQUID MANURES.

Historical, geological, and even mythical evidence fails to assign a definite date to the time when some pre-historic man, more observant than his predecessors and contemporaries, first noticed that plants grew best where animal excreta chanced to fall, and then, putting his discovery into practice, laid the foundation in the art of manuring soils to enhance their productiveness.

Silent as history is on this epoch-making step in human progression, all the traces of evidence seem to indicate that the use of manurial substances in both solid and liquid form were known to the most ancient peoples of whom we possess records. And the application of plant food in a fluid condition must have soon followed the original discovery of the truth of the manurial application, if not even co-existent with the same. Egyptian, Hebrew, Greek, Roman, Aztec, and Duca all knew the value of liquid manurial agents, and practiced this knowledge in the growth of their food and clothing, however little they may have been versed in what we moderns designate as the "science of fertilization."

In China and Japan, the farmers of to-day follow the art of liquid manuring just as their fathers and ancestors for thousands of years have set the example. Indeed, the thronging millions of Asia have no record of any other or preceding mode of fertilization, and their teeming soil has never produced food in response to any other method of recuperation; yet the supplies have, through ages of history, seldom failed, and have sufficed to sustain population more dense than those of any other regions of the earth.

Nor is this practice of interest from its antiquity alone, for, ancient as its origin may be, and tenaciously as it may have been adhered to by people of a former civilization, it has never wholly failed of support among the most intelligent of men and enlightened of nations.

In Switzerland, Bavaria, Northern Italy, and Belgium hardly any other means of fertilization are practiced, while throughout France, Germany, England, and Scotland, for certain crops and on certain soils, this method of treatment is largely adopted. The most pregnant feature of this circumstance is the fact that whenever this manner of manuring is in vogue, these abundant crops grow, and the lands wherein the practice is most universal are the regions which, considering the nature of their locations, maintain the highest ratio of population to the number of acres under cultivation.

Here arises the pertinent fact that in America this method of supplying the crop with its food material has never met with general favor, and among the reasons assigned for this condition of things, the following are most forcibly presented:

With us, as in all new countries, economical fertilization is not yet the stern necessity it must ere long become. It is commonly believed that liquid manuring can be profitably pursued only with small areas, as its extensive practice is supposed to necessitate costly arrangements for storage and application. Further, the belief is general that the beneficial results of this practice are not in reality due to the form of manurial supply, but rather to the necessary and accompanying use of large quantities of water. Again, it is supposed that the method is applicable to only peculiar and limited formation of soil. Also, that though many crops are increased in quantity by this means, the quality of some, particularly of grass, is supposed to be materially injured by the process.

Without immediately endeavoring to explain either the truth or error of these conceptions, we will pursue our experimental investigation of the problem presented, that the accepted opinion may be met by the evidence of demonstrable facts.

Before, however, attempting to oppose error by individual testimony, the present knowledge possessed on the subject under consideration, and record of the facts as now applied by successful practitioners, requires enumeration.

In different lands, various substances are designated as "liquid manure," and various methods are adopted for the preservation and use of the materials.

In Asiatic countries the term is almost exclusively applied to night-soil, the chief source of vegetable nutrition, never applied except in liquid form. In Europe, the name is frequently given solely to animal urine. But the appellation most properly belongs to animal excreta, both solid and liquid, applied to the soil in a fluid condition, produced by the artificial addition of water. And, in my record of experiments, this is the definition adopted for the expression.

On the continent of Europe, wherever the use of liquid manure is practiced, the method pursued is usually a very simple one: Every farm-yard, commonly the front-door-yard as well, possesses an excavation or vat immediately connected with the storage place for the stable collections, in which the liquid portion of the excreta is allowed to gather, or into which the entire manure deposit from the stables is immediately secured. Rain, or other water, is given access to the mass, which, after being allowed to undergo decomposition for six weeks or more, is dipped or drawn off and applied to the growing crop, usually by hand, though the most common means of conveyance is an elongated cask or barrel placed longitudinally on wheels; from this transporter the fluid is drawn, and conducted to its final destination either by hose or bucket.

Though not particularly convenient, it is true, yet if we remember that all forking, shoveling, and composting are thus avoided, the labor of this application can hardly exceed that required by the more common method of spreading the solid substance on the surface of the field.

There are many more complicated and costly appliances for the distribution of this material, such as air-tight iron carts provided with pumping apparatus, but the expense of such appurtenances is seldom necessary, particularly as American barns are so generally located where gravity can perform most of the labor of loading as well as of unloading the manurial fluid.

In England, the most extensive and costly arrangements for the distribution of this material have been adopted, whereby the liquid manure is conducted to the fields by a system of piping, and then compelled to descend on the growing crops in the form of an artificial and nutritive rain. But these expensive arrangements are not only uncalled for and unremunerative, but have brought discredit on the whole system, serving doubtless to deter many a farmer from making attempts at this method of furnishing his crops with substance.

In China and Japan, the system is nearly identical with the Swiss and Bavarian, except that the material applied is derived from a very different order of animals.

With these facts established, let us now examine the results attained by my personal experimental study of their significance.

A statement of the direct objects in view is first essential. The following questions most naturally present themselves, and to them answers were experimentally sought.

First. Does the application of manure in a fluid state necessitate a greater outlay of labor and capital than required by the usual methods of application?

Answer. No.

Second. Will a comparison of two fields, cultivated side by side under like condition, except a difference in the physical form of the fertilizer used, show an advantage of one form over the other?

Answer. Yes; but not always with the same form of manure, the advantage varying with different crops, from the liquid to the solid, and *vice versa.*

Third. Will a field treated with liquid manure *once only* in a season, as in the usual mode with solid manure, evince the advantage claimed for the liquid form of application, the excess of water to which the increase in yield is often alleged being avoided?

Answer. Yes.

Fourth. Is grass grown according to this method really of an inferior quality?

Answer. No.

Fifth. The advantage of chemical fertilizers lying in their extreme solubility, will a comparison of such fertilizers with liquid manure show a corresponding superiority, and indicate that any advantage it may possess is solely one of solubility and ready assimilability?

Answer. Yes.

Sixth. Liquid manure being simply plant food in solution, does it possess any lasting properties? If it possesses advantages, are they continued beyond the first crop?

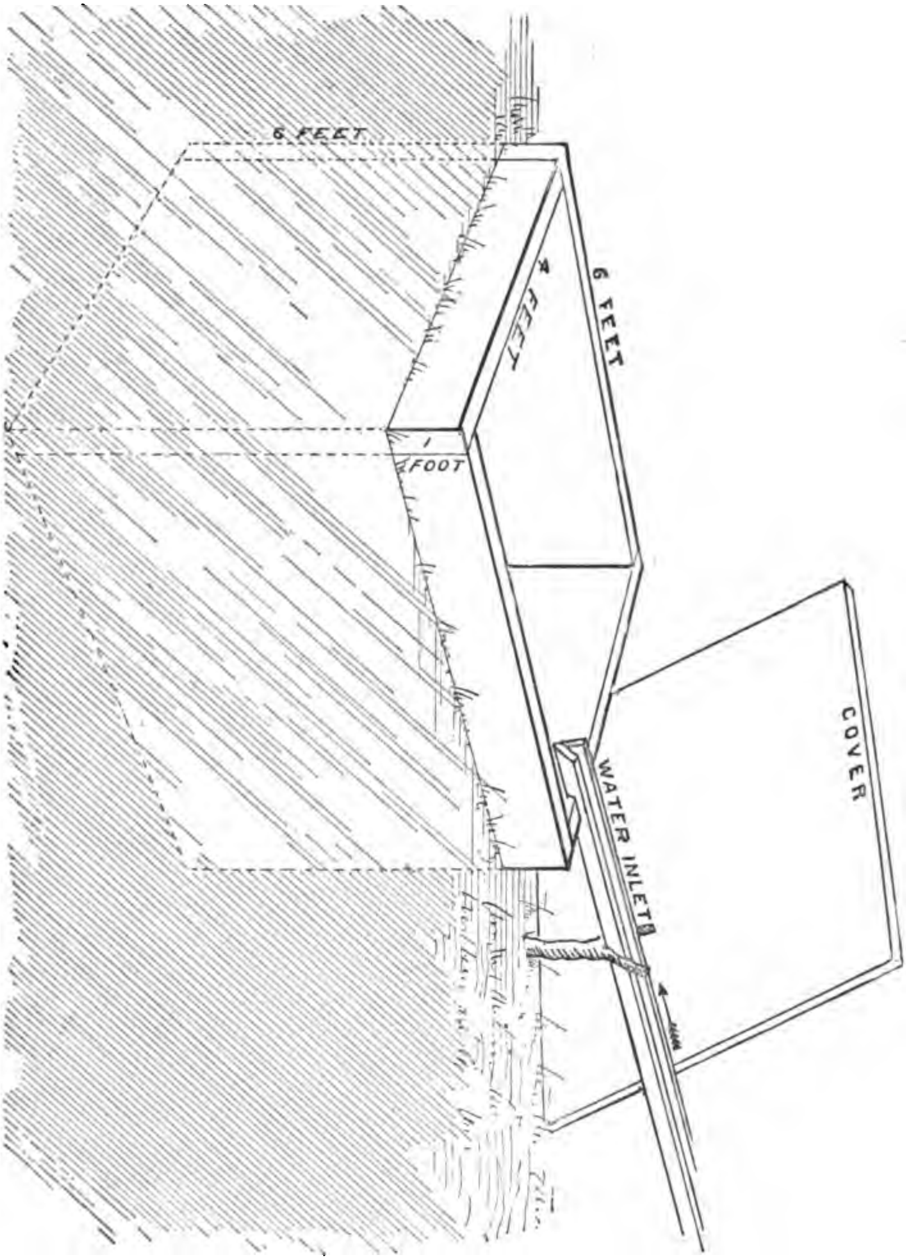
Answer. Yes.

Let us now examine the experimental evidence on which these verdicts are based. The whole number of acres devoted to the study of these questions was three and three fourths acres, the following crops being selected for treatment: Indian corn, 2 acres; oats, 1 acre; grass, ¼ acre; potatoes, ¼ acre, and garden crops, ¼ acre.

The manurial substance used was obtained from five adult human beings, two horses, one cow, and several fowls.

The treatment and,means of utilization of this material were exceedingly simple. The portion used in a solid condition was protected from the weather, mixed with absorbents, and used in a thoroughly rotted condition. That portion applied in a fluid state was stored in a wooden vault sunk in the ground, mixed with rain, or other soft water, as the case might be. This storage vault was constructed as follows:

The earth was excavated to the depth of five feet. In the aperture thus formed a box was built, six feet long, four feet wide, and six feet deep, composed of two-inch plank, matched to make water-tight. The upper edge of the vault thus extended one foot above the surface elevation, and was fitted with a movable cover. The receptacle thus made was so situated that water from either the roof or the well could be run into it as occasion demanded.



VAULT.

The excreta were deposited in the vault daily, and a little dry earth added from time to time as a deodorizer, the contents, however, being kept in a fluid condition.

Once every two weeks, sufficient water was added to reduce the mass to a liquid containing about four per cent. of solid matter, and applied directly to some one or more of the crops under investigation, then, in the case of hoed crops, being thoroughly incorporated with the surface soil.

For emptying the vault and applying the fluid, two large buckets, each of four gallons' capacity, were utilized and carried suspended from the ends of a pole resting on the shoulder. To assist in clearing the receptacle, and in applying the manure, a long-handled dipper of wood, with capacity of half a gallon, was brought into requisition. The close proximity of the vault to the experimental plots rendered other appliances unnecessary. Had transportation been required, however, a simple "barrel-cart" would have sufficed.

The entire outfit is estimated to have cost seven dollars, but could doubtless have been procured by any Pennsylvania farmer for a smaller cash outlay.

We are now in a condition for an individual consideration of each experiment undertaken and the facts developed.

The amount of manure applied in each case is immaterial, so long as the amount used in each of the two forms opposed to each other remained equal, and is, therefore, not stated. In each case, what was considered an abundant supply of solid plant food was applied, and the liquid manure was the same amount, but in a fluid condition, no other form of procedure or of statement being possible, as the amount or volume of liquid manure considered has no value, and conveys no idea of quantity of food contained, without a complete chemical analysis of its composition.

The same fact holds true of solid excreta as well, but in a less degree, its value and content of actual nutritive material varying with every change in condition and variation in the diet of the animals yielding the product in question.

In my statement of results (*a*) denotes liquid manure, while (*b*) is used to designate the solid form.

EXPERIMENT No. 1, undertaken in answer to questions two and three; *crop cultivated*, *corn;* time of application, (*a*) after the crop was two feet high, (*b*) plowed in before planting; *result*, (*a*) yield of shelled corn per acre, reckoned at seventy pounds per bushel on the ear, seventy two bushels; (*b*) fifty-three bushels. Average samples of straw weighed showed a ratio between (*a*) and (*b*) of 32:21. The yield of grain compared, 72:53, gives a ratio of 32:22.3. This experiment, therefore, affords additional evidence that the greater the solubility of a farm of plant food, the larger the immediate return therefrom, and that, in the case of liquid food *versus* solid food, the ratio of return is as 72:53, as an advantage of 26:38% in favor of the former method of application, and that as applied to fodder, &c., to foliaceous plants, this difference is slightly increased.

EXPERIMENT No. 2. Object, same as with No. 1; *crop*, *potatoes;* time of application, (*a*) when the plants were about four inches high, (*b*) plowed in before planting; *results*, (*a*) yield 370 bushels per acre, (*b*) 295 bushels per acre. This experiment gives evidence that the advantage in form of manurial application is 20:05% in favor of the most soluble food.

EXPERIMENT No. 3. Object, same as with Nos. 1 and 2; *crop*, *strawberries ; result*, average yield of fruit per row of twenty-five plants, (*a*) twenty-four pounds and one ounce, (*b*) twenty-five pounds, an average difference per plant of 0.24 of an ounce to the credit of the solid food. But a marked difference in the character of the foliage was discernible through the entire season, the plants to which the fluid manure was applied, only once, and after the buds were formed, making far more abundant and luxuriant foliage. These facts would indicate that form of application of the food sufficed for all necessities of the plant, but that the greater solubility of the liquid manure tended to the formation of an excess of foliage; in the case of strawberries, a useless superabundance.

EXPERIMENT No. 4, undertaken in response to question 5, liquid manure opposed to potassium nitrate ($K. N. O_3$), and soluble phosphoric acid ($H_3 P O_4$) making a complete plant food. *Crop*, *strawberries* not yet come into full bearing, so that only the effect on growth could be observed. Time of application, three times during the season; first, before blossom appeared, second, while in full bloom, and third, when the bearing season was past. *Result*, after the first application, the chemical manure seemed to produce the greater benefit, but with the two following treatments the liquid manure gained and soon overcame competition, the average weight of the plants treated according to (*a*) being sixteen and one half ounces, while (*b*) shows a record of just eleven ounces. This would tend to establish the fact that, even as opposed to perfect plant food, the excess of water supplied with the liquid manure is, so far as the formation of foliage is concerned, in favor of the latter in a ratio of 1:1.45, or an advantage of 31.25%.

EXPERIMENT No. 5. Object same as with Nos. 1, 2, and 3; *crop*, *peas;* time of application *and* when the plants were about six inches high. *Result*, (*a*) plants became yellow and sickly within twenty-four hours after application, and lost fully a week's time before recovering, being distanced to this extent by those treated according to (*b*).

This case further illustrates and emphasizes the fact that the use of these liquid plant foods is not unattended by danger, and must be resorted to understandingly.

In this case, as is inevitable whenever a fertilizer contains liquid excrement or fowl droppings, urea is a chief constituent of the manure. This substance ($C H_4 N_2O$) is a most valuable source of nitrogen, containing 46.66 per cent. of this element; but in the form of urea, this nitrogen is unavailable as plant food. Exposed to the atmosphere, however, it undergoes a rapid decomposition, becoming transformed into ammonium carbonate, ($N H_4 CO_3$) which in the soil becomes direct plant food. If nutritive solutions are applied to the soil in too great a degree of concentration, the diffusion of water to the plant is prevented, and the latter wilts. If this wilting process continues sufficiently long, death ensues.

A still more serious result than the mere wilting of the plant may follow the application of liquid manure in too great concentration.

The transformation of urea into ammonium carbonate, either in the air or in the soil, is the effect of bacterial action. But these lower organisms can exist only in access of oxygen, and below a certain depth of soil, about two feet, their existence and vital action is impossible. Strong solutions of manurial substances may therefore penetrate the soil below the depth of possible transformation; and the urea, not of itself capable of either soil combination or of plant assimilation, becomes worthless as a source of vegetable nitrogen.

EXPERIMENT No. 6. Object same as with the preceding; *crop*, *celery*; time of application, *once* when plants were six inches high; *result*, (*a*) plants began to mature and send out seed stocks about a week after manurial application, a condition never before observed by me with this usually biennial plant. More than half the crop was ruined, while (*b*) is now ready for blanching. Concerning this phenomenon, I have at present no explanation to make, but believe it to have resulted from a conjunction of causes, of which the sudden accession of unusually warm and moist weather may have been none of the least.

EXPERIMENT No. 7, undertaken with the same object in view as the foregoing; *crop*, *tomatoes*; time of application, time of transplanting from pots, plants about six inches in height; *one* application only. *Result*, (*a*) yielded fruit fully six days earlier than did (*b*), no other difference being detectible. Both plants were severally pruned, and this treatment seemed to hasten maturity also, for (*b*) produced ripe fruit earlier than did any vines not subjected to this forcing process. Fifteen plants were subjected to the test with each method, but the results were unanimously as stated.

EXPERIMENT No. 8, undertaken with the object of shedding light on question six; *crop*, *oats;* condition of cultivation, liquid manure had been applied sparingly during two preceding years, during which time wheat and potatoes were grown on the soil, and previous to which no fertilizer had ever been applied. *Result*, yield of oats, forty-five and one half bushels per acre. Here, then, is another bit of evidence to support the conclusion that soil-fertility may be maintained by the exclusive use of liquid manures for several successive crops.

EXPERIMENT No. 9, referring to question three. The manure was applied in one application before the grass began to start in April. *Result*, (*a*) yield of hay per acre, five thousand four hundred and forty pounds; (*b*) yield of hay per acre, four thousand seven hundred and eighty pounds, or an advantage of 12.22 per cent. on the side of the liquid application. The grass grown was a mixture of clover, timothy, and red top, and was sown one year previous to the time of beginning the experiment. We have here added proof that the growth of grass with liquid manure is not the result of irrigation, but of the action of soluble plant food supplied in the form of liquid manure.

It is usually conceded the use of manurial substances in a fluid condition tends to increase the formation of foliage, and is hence eminently adapted to the production of grass, but that the product is of an inferior quality is as frequently alleged.

With the hope of gaining new light on the subject, EXPERIMENT No. 10 was undertaken.

A full-blood Ayrshire cow, five years old, five months in milk and not with calf, was fed exclusively on grass grown according to (*a*) for ten days, with the following average daily yield of milk: eleven and one fourth pounds. After a lapse of one week, she was subjected to a diet produced by (*b*), resulting in an average daily yield of eighteen and three fourths pounds. The milk thus obtained, subjected to examination, no appreciable difference in solid constituents could be detected; the quantity and quality of the butter produced, dependent on weather and other external influences, did not vary.

Here, then, is evidence, so far as one animal can furnish it, that the milk and butter produced from grass grown from liquid manure neither in yield nor in character are in any way inferior to those produced from the best natural pasturage. But it must be borne in mind that the cow consumed of each variety of food *all her appetite craved*, the comparative character of the grass *pound for pound* not being here considered.

Let us now examine the evidence thus developed and draw the deduction following in logical sequence.

But it should be distinctly understood that experiments so limited as these, and extending over a single season only, cannot be expected to *prove premises*, or even to *demonstrate facts*.

They can be regarded only as *indications*, but the entire evidence adduced appears to reasonably admit of the following

CONCLUSIONS.

As compared with solid manure, the liquid form of application possesses with the three crops, corn, potatoes, and strawberries, an average advantage of 25.86%.

With the two crops, corn and strawberries, the ratio of advantage is greater with the foliage than with the fruit, or that any advantage possessed seems to be greater with foliaceous plants than others.

By two experiments on peas and celery, caution and an understanding of the principles involved are demanded, and that universal resort to this method of manuring cannot be advised or looked forward to is again here illustrated.

All the experiments give unanimous verdict that whatever may be the action of liquid manures, the result is due to the presence of an abundance of plant food in a soluble and easily assimilated form, and that water, as such, does not enter into the problem.

Scientific knowledge and practical experience both seem to indicate, and join in a unanimous verdict, that American farmers, by neglecting to adopt the liquid form of manurial application, fail to avail themselves of what, when rationally followed, must prove not necessarily the talisman to assured success, but one of the adjuncts of farm practice, which few can afford to wholly neglect. And though we have found that the system offers no invariable advantages, and may even, with some crops, prove a serious disadvantage, no very elaborate labors would be required to systematically separate and arrange the cases of probable success and failure with this time-honored method.

And, although all attempts at the discovery of an invariable and undeviating road to fortune, ever have and always must fail, an extended observation of those farms, in any community, on which there is proportionally the most liquid manure applied, can hardly fail of teaching a lesson fraught with practical wisdom.

H. E. STOCKBRIDGE, P. H. D.

Light Brahmas.

C. Shoemaker: 1st, on pen, cockerel, and pullet; 2d, on pen and cockerel; 3d, on cockerel.

S. S. Bossert: 2d, on pen; 1st and 2d, on cock; 1st on hen; 2d, on pullet.

J. S. Cope: 3d, on pen.

Henry Jackson: 4th, on pen.

J. D. Nevius: 3d, on hen.

Kings Poultry Yards: 3d, on cock and pullet.

Dark Brahmas.

John Lilly, Lambertville, N. J.: 1st, on pen; 1st, on cock; and 1st and 2d, on pullets.

Buff Cochins.

J. D. Nevius: 1st, on pen, cock, hen, cockerel, and pullet.
H. B. & A. F. Bancroft: 2d, 2d and 4th on pens; 3d on cock; and 2d and 3d, on hens.
T. R. Carns: 2d, on cocks.
Henry Jackson: 2d and 3d, on cockerels; 2d and 3d, on pullets.

Partridge Cochins.

No awards given.

Langshans.

Geo. Fox: 1st, on pen; 1st, on cockerel and pullet.
J. H. Downing: 2d, on pen; 1st, on hen; 3d, on cockerel, and pullet.
C. T. Thomas: 4th, on pen; 2d, on cockerel.
B. F. Lewis: 2d, on hen.
J. S. Cope: 3d, on pen.

Silver Gray Dorkings.

W. W. Wagner: 1st, on pen, cock, hen, cockerel and pullet.
B. F. Lewis: 2d, on cock and hen.
J. S. Cope: 2d, on cockerel and pullet.

Colored Dorkings.

W. W. Wagner: 1st, on hen, pullet and cockerel.

Dominicks.

J. C. Price: 1st and 2d, on cockerel and pullet; 1st, on pen.
John Stewart: 3d, on pen, cock, and hen.

Plymouth Rocks.

L. G. Thomas: 1st, on pen, hen, cockerel and, pullet; 2d, on cock; 3d, on hen, 2d on pullet.
S. S. Bossert: 3d, on cock; 2d, on cockerel; 3d, on pullet.
B. F. Lewis: 4th, on pen; 3d, on cock; 2d, on hen.
J. S. Cope: 3d, on pullet.
Peerless Poultry Yards: 3d, on cockerel.

White Plymouth Rocks.

Belmont Perry: 4th, on pen; 3d, on cockerel and pullet.

Wyandottes.

C. T. Thomas: 1st and 2d, on pen and pullet; 2d, on hen; 1st and 2d, on cockerel; 3d on cock.
G. W. Campbell: 4th, on pen; 3d, on cock and hen.
John S. Cope: 3d, on pen.
H. B. & A. F. Bancroft: 4th, on pen.
W. W. Stewart: 1st, on cock and hen.
Peerless Yards: 3d, on cockerel and pullet.

White Wyandottes.

Belmont Perry: 3d, on cockerel.

Crevecœurs.

C. T. Thomas: 1st, on pen, cock, hen, cockerel, and pullet.

Houdans.

Kings Park Yards: 2d, on pen; 1st, on cock, hen, cockerel, and pullet.
J. S. Cope: 1st, on pen.
B. F. Lewis: 2d and 3d on cock and hens.

La Fleche.

J. D. Nevius: All the prizes.

Courtes Patties.

J. D. Nevius: All the prizes.

Silver-spangled Hamburgs.

B. F. Lewis: 1st, on pen, cock, and hen.
P. N. Parsons: 1st and 3d, on pullet; 2d, on cockerel.
John Stewart: 1st, on cockerel; 2d, on pullet.

Silver Penciled Hamburgs.

T. K. Bennett: All the prizes.

Golden Penciled Hamburgs.

John Stewart: All the prizes.

Golden-spangled Hamburgs.

Thomas Powell: All the prizes.

White Crested Black Polish.

A. B. Seymour: 1st, on pen, cock, and hen.
S. S. Bossert: 2d, on pen; 2d and 3d, on cock; 3d, on hen.

Buff Polish.

Belmont Perry: All.

Golden Polish.

No awards.

White Games.

B. C. Thornton: 1st, on pen, cock, hen, and pullet; 2d, on hen.
M. J. Gorman: 1st, on cockerel; 2d, on pullet.

Black Games.

B. C. Thornton: 1st, on pen, hen, and pullet; 2d, on hen and cockerel.

H. H. Harness: 1st, on cock and cockerel; 2d, on hen and pullet: 3d, on hen.

Sumatra Games.

Belmont Perry: All.

Black Breasted Red Games.

B. C. Thornton: 1st, on cockerel; 3d, on pullet.
M. J. Gorman: 2d, on cockerel.
Westervelt, Haywood & Co.: 2d, on hen.
T. K. Bennett: 1st, on pen, cock, and hen; 2d, on pullet.
John Fleming: 3d, on pen; 2d, on cock.
J. A. Stovell: 2d, on pen; 3d, on cock, hen, and cockerel; 1st on pullet.

Brown Breasted Red Games.

T. K. Bennett: 1st, on pen, cock, hen; 2d, on hen
J. A. Stovell: 2d, on pen and cock; 3d, on hen.

Red Pile Games.

B. C. Thornton: All.

Silver Duckwing Games.

John Penfield: All.

Golden Duckwing Games.

Westervelt, Haywood & Co.: 1st, on pen and cockerel.
T. K. Bennett: 1st, on hen.

Derby Games.

Wm. Wirt: All.

Black-Breasted Red Game Bantams.

John Filkin: 1st, on hen, cockerel, and pullet.
John Stewart: 2d, on pen, hen; 3d, on cockerel.
Westervelt, Haywood & Co.: 3d, on cock.
T. K. Bennett: 1st, on pen and hen; 2d, on cock and cockerel; 3d, on pullet.
Kinter & Co.: 3d, on cockerel.
J. G. Darlington: 3d, on pen and hen.

Brown-Breasted Red Game Bantams.

Westervelt, Haywood & Co.: 1st, on pen, cockerel, and pullet; 2d, on hen and pullet; 3d, on cockerel.
T. K. Bennett: 1st, on hen.

Red Pile Game Bantams.

Westervelt, Haywood & Co.: 1st, on pen, cock, hen, cockerel, and pullet; 2d, on cockerel and pullet.

John Stewart: 3d, on cock.

J. C. Maple: 2d, on hen.

T. K. Bennett: 2d, on pen and cock.

White Pile Game Bantams.

J. C. Maple: 1st, on hen.

Westervelt, Haywood & Co.: 1st, on pullet; 2d, on cock.

White Game Bantams.

Westervelt, Haywood & Co.: All.

Black Game Bantams.

Westervelt, Haywood & Co.: 2d, on pen, hen, and pullet; 1st, on hen, cockerel, and pullet.

Charles Collins: 2d, on cock; 3d, on hen.

Golden Duckwing Game Bantams.

T. K. Bennet: All.

Silver Duckwing Game Bantams.

J. C. Maple: 1st, on pen, hen, cockerel, and pullet.

J. G. Darlington: 1st, on cock; 2d, on pen and hen.

Pekin Bantams, (not Game.)

Belmont Perry: 1st, on cock; 2d, on pen, hen, and cockerel; 3d, on cock, pen, and pullet.

B. S. Koons: 1st, on hen.

C. T. Thomas: 1st, on pen, cockerel, and pullet; 2d, on cock and hen.

C. Turnbull: 3d, on pen and cockerel; 2d, on pullet.

Golden Sebright Bantams.

B. Perry: 1st, on pen and cock; 3d, on hen.

J. C. Maple: 1st, on hen; 2d, on cock and hen.

Kinter & Co.: 1st, on pullet.

Silver Sebright Bantams.

B. Perry: 1st, on pen and hen; 2d, on cock.

B. S. Koons: 1st, on cockerel and pullet.

J. C. Maple: 3d, on cock and hen.

Westervelt, Haywood & Co.: 1st, on cock; 2d, on hen, cockerel, and pullet.

Rose-Comb Gray Bantams.

Wilford Corry: All.

Japanese Bantams.

B. Perry: 1st, on pen, hen, and cockerel; 2d, on cock; 3d, on cock and hen.
B. S. Koons: 1st, on cock and pullet; 2d, on hen.

White Rose-Comb Bantams.

B. S. Koons: 1st and 2d, on pullet.
B. Perry: 1st, on hen.

White Polish Bantams.

B. Perry: All.

White-Booted Bantams.

B. Perry: All.

Red-Crested Black Bantams.

J. O. Maple: 1st, on pen, cock, hen, cockerel, and pullet; 2d, on hen.
B. Perry: 2d, on pen and cock; 3d, on hen.
Schum & Lipphold: 3d, on cock.

Cuckoo Bantams.

Belmont Perry: All.

MISCELLANEOUS.

Rumpless.

B. F. Lewis and B. Perry: All.

Frizzlies.

B. F. Lewis: All.

Silkies.

B. Perry: All.

Turkeys.

B. F. Lewis: All.

Toulouse Geese.

Kings Park: 1st and 2d.
B. F. Lewis: 3d.

White China and Wild Geese.

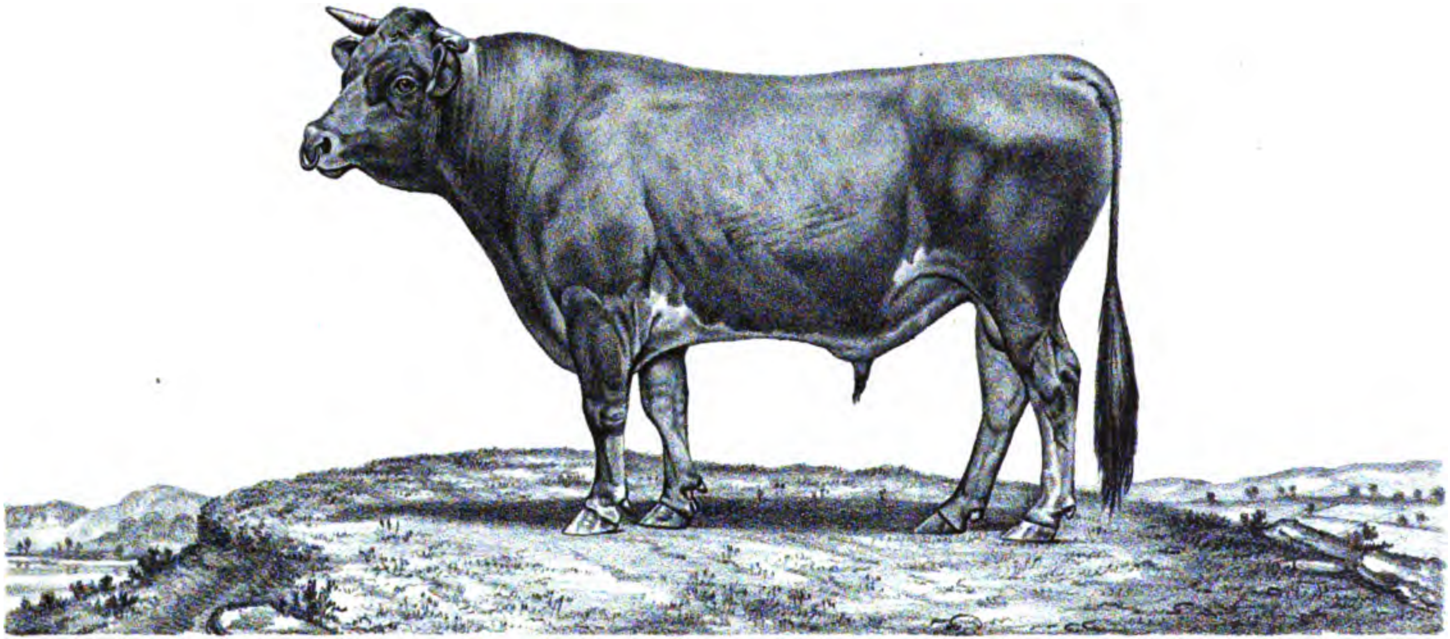
B. F. Lewis.

Cayuga Ducks.

Kings Park Yards: 1st and 3d.
Freeman & Dutton: 2d.

Pekins.

W. K. Reese: 1st.
B. F. Lewis: 2d.
Kings Park Yards: 3d.



FANCY'S HARRY,

OWNED BY W. J. WEBSTER.

Aylesburys.

Kings Park Yards: 1st.
B. F. Lewis: 2d.

Crested Ducks.

B. F. Lewis: 1st.
J. A. Stovell: 2d.

Guineas.

B. F. Lewis.

Black Spanish.

Thomas Powell: 1st, on pen, cock, hen, and cockerel; 2d, on cock, hen, and pullet; 3d, on cockerel.
John Stewart: 1st, on pullet; 2d, on pen and cockerel.

Brown Leghorns.

Thomas Powell: 1st, on pen, cock, and pullet; 2d, on pullet.
Bayley Fox: 2d on cock; 3d, on pullet.

Rose-Comb Brown Leghorns.

S. S. Bossert: 1st, on pen, cock, hen, cockerel, and pullet; 2d, on cockerel and pullet; 3d, on pen and hen.
Freeman & Button: 3d, on cock.

White Leghorns.

George Fox: 1st, on pen, cockerel, and pullet; 2d, on pen, cockerel, and pullet; 3d, on cockerel.
Bayley Fox: 3d, on pen.
B. F. Lewis: 1st, on hen.

Rose-Comb White Leghorns.

W. S. Miller: All.

Black Minorcas.

J. D. Nevius: 1st, on pen, cock, hen, and cockerel: 2d and 3d, on pullets.
Henry Jackson: 1st, on pullet; 2d, on cockerel.
Kings Park Yards: 3d, on cockerel.

Caged Birds.

Premiums to H. N. Vahle, B. Perry, William Lindsay.

Rabbits and Guinea Pigs.

Premiums to Schum & Lipphold, B. F. Lewis, William Wirt.

Pigeons.

Premiums to J. A. Stovell, George Fox, Jesse G. Darlington, Thomas Scholes, F. F. Kampe, T. R. Cairns, W. H. Ehninges, M. Hoepner, E. M. Ball, D. A. Nichols.

Incubators and Brooders.

Universal Incubator and Buckeye Brooder.

Caponizing Instruments.

W. H. Wigmore.

J. A. Stovell, Philadelphia, Pa.: 1st, on Dun Carriers; 2d, on Red Checkered Antwerp; 2d, on White English Owls; 2d, on Blue African Owls; 2d, on Silver African Owls; 1st, on Blue-Tail English Owls; 1st, on Black-Tail English Owls; 3d, on Yellow Magpies; 3d, on Black Magpies; 2d, on Red Turbits; 1st, on Blue Tail Turbits; 1st and 2d, on Yellow Tumblers; 1st, on Dun Tumblers; 1st, on Black; 2d, Red Tumblers; 1st, on Starling Quokers; 1st, on Dutch Starling; 1st, on White Antwerps; 2d, on Blue; 1st and 2d, on Blue Checkered; 2d, on Silver Antwerps; 1st, on Red Tumblers; 1st, on Powdered Blue Owls.

Jesse G. Darlington, Hestonville, Pa.: 1st, on Black; 1st, on Red Jacobins; 3d, on Black Turbits; 2d, on White; 2d, on Silver Owls; 1st, on Blue Muffled Owls; 1st, on Yellow Ball.

George Fox, Holmesburg, Pa.: 1st, on Blue Antwerps.

Schum & Lippold, Lancaster, Pa.: 1st, on Silver Winged Turbits; 1st, on Blue Priests; 1st, on Black Helmets; 2d, on Starling; 1st, on Black Trumpeters; 1st and 2d, on Ice; 1st, on Archangels; 1st, on Black Moorheads; 3d, on Blue Balls; 1st, on Blue Checkered; 1st, on Dun Dragoons.

George Clothier, Jr., Philadelphia, Pa.: 2d, on White Jacobins.

Thomas Scholes, 2649 North Fifth street, Philadelphia: 1st, on Blue Balls Shortfaced; 1st, on Silver; 1st, on White English Owls; 1st, on White Blue and Silver African Owls; 1st, on Red and Blue; 2d, on Silver Chinese; 1st, on White Chinese; 1st, on Powdered Blue Chinese; 2d, on Powdered Blue English; 2d, on Satinetts; 1st, on Spangled; 2d, on Blue Blondinetts.

F. F. Kampe, 1123 Poplar street, Philadelphia, Pa.: 2d, on Black; 1st, 2d, and 3d, on Blue; 1st and 2d, on Yellow; 1st, on Red Pouters; 1st, on White; 2d, on Red Jacobins; 1st, on White-Crested Fans; 1st, on White Dutchies.

B. F. Lewis, Gwynedd, Pa.: 1st, on Red Checkered; 1st, on Silver Antwerps; 1st, on Black English Owls.

Thomas Cainss, Bridgeport, Conn.: 1st, on Red; 1st, on Almond: 1st and 2d, Yellow Short-faced Tumblers; 1st, on Black Kite Tumblers.

W. H. Ehringer, Jr., Philadelphia, Pa.: 1st and 2d, on Black; 1st and 2d, on Red; 1st and 2d, on Yellow-Crested Magpies; 1st, on Yellow; 2d, on Black; 3d, on Red Jacobins; 1st, on Red and Yellow Winged Turbits; 1st, Blue Barless Swallows.

Martin Hœpfner: 1st, on Black Priests White Bars; 1st, on Blue Brunswicks; 1st, on Blue Tumblers, Feather-legs; 1st, on Black; 2d, on Red Beards; 3d, on Black; 2d, on Yellow Turbits; 1st, on Yellow Priests.

Edward deM. Ball, Philadelphia · 2d, on Blue winged Turbits.

David A. Nichols: 1st, on Black, Red, and Yellow Nuns; 2d, on Blue Barless Swallows; 1st, on Blue-crested Magpies; 1st, on Blue Smooth-head do.; 1st and 2d, on Black do.; 3d, on Red Smooth-head Fantails; 1st and 2d, on White Dragoons; 2d and 3d, on Archangels.

LIST OF ANNUAL MEMBERS.

1886.

Abel, Lewis.
Boyd, George W.
Boyd, Harry.
Boehmer, F. A.
Buehler, H. B.
Boyd, J. Brisban.
Blessing, Frederick D.
Bigler, Charles.
Bergner, Frederick.
Brady, A. E.
Boas, C. Ross.
Chandler, W. G.
Cleveland, A. M.
Cohen, H.
Cilly. Charles.
Covert, J. W.
Einstein, Joseph.
Einstein, Edward.
Etter, Charles.
French, Michael.
Gross, Joshua.
Hershey, Henry.
Holbert, Robert.
Hargest, Thomas.
Jones, Thomas, Jr.
Jones, William.
Kunkel, Samuel.
King, George.
Kepple, Edward.
Kunkel, Charles.
Lingle. Charles.
Leib, Frank R.
Montgomery. James B.
Metzger, Charles.
Oppenheimer, A.
Pool, Samuel.
Peiper, J. R.
Pilkey, J. J.
Russ, James.
Reinhoeld, Henry.
Sheahan, Malachi.
Smull. William P.
Snyder, Charles.
Snyder. Eugene.
Seiler, Frank W.
Seiler, W. E.
Sweeney. John.
Stovell, J. A.
Thompson, Benjamin.
Till, W. B.
Uhler, Henry.
Weaver, John.

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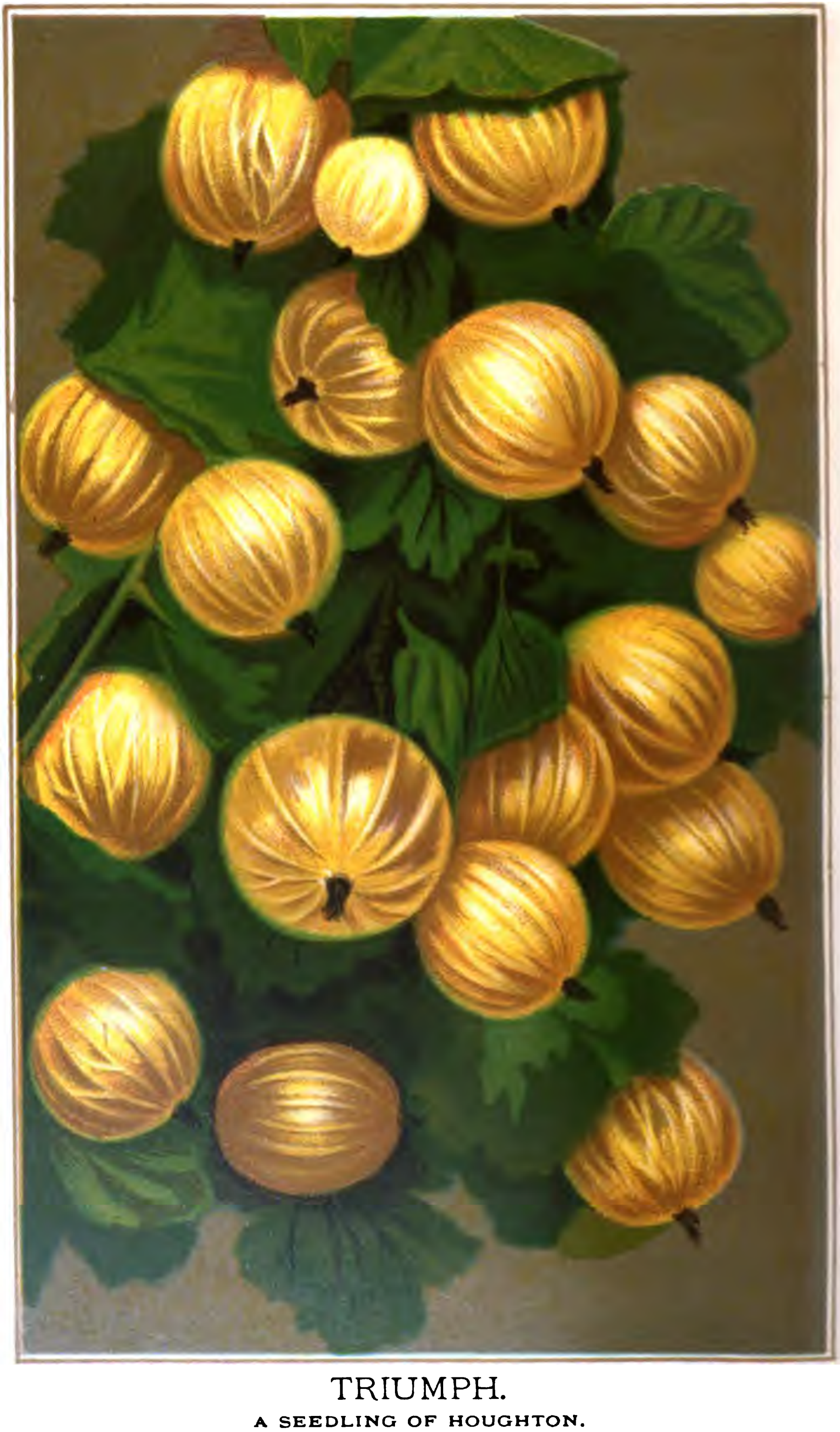


TRIUMPH.

A SEEDLING OF HOUGHTON.

Origin, Catawissa, Pennsylvania, on the premises of F. F. Mercerou. A good grower, making strong upright canes, which however, droop somewhat when loaded with fruit. Leaves glossy, and rather larger than other varieties. Quality good. Season, last of June.

[illegible] growers [illegible] science [illegible]

Article 2. [illegible] of a [illegible] one [illegible] and [illegible] ment of [illegible]

Article 3. [illegible] a President [illegible] a [illegible] Secretary [illegible] whose [illegible]

Article 4. [illegible] Corresponding [illegible] ers, or [illegible] President, [illegible] Executive Committee [illegible] and Treasurer [illegible] Committee [illegible] members [illegible] a general [illegible] Committee [illegible]

[illegible] time, elect honorary [illegible] time to time, appoint [illegible] Corresponding [illegible] [illegible] by a vote [illegible] present [illegible] not [illegible]

[illegible] by a vote of [illegible] read: [illegible] tion, and [illegible] of the Society shall [illegible] considered [illegible] relative to the interests [illegible] ation.

[illegible]

[illegible] ING OF HOUGHTON.

[illegible]

REPORT

OF THE

State Horticultural Association of Pennsylvania.

CONSTITUTION.

ARTICLE 1. This Society shall be entitled the "Pennsylvania Fruit Growers' Society,"* and its object shall be the advancement of the science of pomology, and the art of fruit culture generally.

ARTICLE 2. Any person may become a member of this Society by a vote of a majority of the members present, at any meeting, and by paying into the treasury the sum of one dollar annually; or the payment of one dollar to the treasurer, at any time, shall constitute membership, and entitle said member to a copy of the proceedings. The payment of ten dollars, at one time, will constitute life membership.

ARTICLE 3. Its officers shall consist of a President, three Vice Presidents, a Recording and Corresponding Secretary, and a Treasurer. all of whom shall be elected annually by ballot.

ARTICLE 4. The following standing committees shall be appointed: A Committee of five on Nomenclature; a Committee of three on Insects, of whom the professor of entomology shall be chairman; an Executive Committee, consisting of the President, Recording Secretary, and Treasurer; † and a General Fruit Committee, consisting of one member from each county represented, with a general chairman of the whole; each member of the Local Fruit Committee to have the privilege of appointing two assistants.

ARTICLE 5. The Society may, at any time, elect honorary members.

ARTICLE 6. The Society may, from time to time, appoint professors on Entomology, Botany, Horticultural Chemistry, and Geology.

ARTICLE 7. This constitution may be altered or amended by a vote of two thirds of the members present, at any regular meeting, notice of the proposed amendment, in writing, having been previously given.

ARTICLE 8. Seven members shall constitute a quorum for the transaction of business.

Name changed at annual meeting, January 1, 1881, by a vote of two thirds of the members present to *State Horticultural Association of Pennsylvania.

†Amended at annual meeting, January, 1885, to read: The Executive Committee shall consist of all the elective officers of this Association, and three of said committee (of which the President of the Society shall be one) shall constitute a quorum to transact any business relative to the interests of the Association.

BY-LAWS.

ARTICLE 1. The Committee on Nomenclature shall collate and decide the standard and synonymous names of all fruits known in the Society, with the authorities for each, and report, so far as practicable, at each regular meeting, and record the same in a book kept for that purpose.

ARTICLE 2. The General Fruit Committee shall carefully and thoroughly investigate the subject of fruit culture in general. Each local committee of three shall collect such useful and interesting information in relation to the subject as may be in their power, and embody the same in monthly reports, to be made to the general chairman; such reports to be by him examined and embodied in his annual and semi-annual reports. Also, that the said county committee shall form *ad interim* committees for their respective counties; and further, that said *ad interim* committees are hereby authorized to publish their reports in the "*Gardener's Monthly*," or such other paper as they may select, the same having been first submitted to the chairman of the General Fruit Committee for his approval: *Provided.* That said publication shall be free of expense to the Association.

ARTICLE 3. The annual meeting of the Association shall be held on the third Wednesday of January of each year, at such a place as the Executive Committee may appoint, at which time the election for officers shall take place; said officers to serve from the close of the meeting at which they are elected to the close of the succeeding annual meeting, at which an exhibition and discussion of fruits shall take place, and other business transacted in the following order:

1st. Reading of minutes of previous meetings.
2d. Roll call and dues collected.
3d. Election of officers.
4th. Reports of officers.
5th. Reports of standing committees.
6th. Reports of special committees.
7th. Unfinished business of former meeting.
8th. New business.

The nomination and election of new members shall be in order at any time during the session.

ARTICLE 4. Other meetings may be convened by the Executive Committee at such time and place as they may appoint.

ARTICLE 5. No member who is in arrears for dues shall be eligible for any office, or serve on any standing committee; and any member who shall neglect to pay his dues shall cease to enjoy the privileges of membership.

ARTICLE 6. A library shall be established for the benefit of the members of this Association, and a Librarian elected annually with the other elective officers.

Section 1. The Librarian shall keep an alphabetical record of the books, &c., and may loan to any member of this Association any books contained therein without cost: *Provided*, That it be returned within three months, and in as good condition as when received.

Section 2. Any member refusing to return to the Librarian books or reports from said library, shall pay its equivalent, or forfeit his membership.

LIST OF OFFICERS FOR 1886.

PRESIDENT.

CALVIN COOPER, Bird-in-Hand.

VICE PRESIDENTS.

JOSIAH HOOPES, West Chester.
H. M. ENGLE, Marietta.
EDWIN SATTERTHWAIT, Jenkintown.

RECORDING SECRETARY.

E. B. ENGLE, Waynesboro'.

CORRESPONDING SECRETARY.

W. P. BRINTON, Christiana.

TREASURER.

GEORGE B. THOMAS, West Chester.

LIBRARIAN.

THOMAS J. EDGE, Harrisburg.

PROFESSOR OF BOTANY.

THOMAS MEEHAN, Germantown.

PROFESSOR OF ENTOMOLOGY.

S. S. RATHVON, Lancaster.

PROFESSOR OF HORTICULTURAL CHEMISTRY.

S. B. HEIGES, Shippensburg.

COMMITTEES FOR 1886.

GENERAL FRUIT COMMITTEE.

Cyrus T. Fox, *Chairman*, Reading, Berks county.

COUNTY.	MEMBERS.	P. O. ADDRESS.
Adams,	J. L. Sherfy,	Gettysburg.
Allegheny,	E P. Swift,	Mount Oliver.
Armstrong,	J. Donaldson,	Kittanning.
Beaver,	A. L. McKibbin,	Green Garden.
Bedford,	J. Z. Replogle,	New Enterprise.
Berks,	C. T. Fox,	Reading.
Blair,	F. Jaekel,	Hollidaysburg.
Bradford,	R. M. Wells,	Towanda.
Bucks,	Henry W. Comfort,	Fallsington.
Butler,	J. W. Phillips,	Zelienople.
Carbon,	E. Bauer,	East Mauch Chunk.
Cambria,	Mrs. Helen V. Austin,	Johnstown.
Centre,	Prof. W. A. Buckhout,	State College.
Chester,	J. W. Pyle,	Willow Dale.
Clearfield,	Samuel Hall,	McGee's Mills.
Clinton,	Joel A. Herr,	Cedar Springs.
Columbia,	J. K. Sharpless,	Catawissa.
Crawford,	James Turner,	Meadville.
Cumberland,	H. S. Rupp,	Shiremanstown.
Dauphin,	Gabriel Hiester,	Harrisburg.
Delaware,	Joseph Lewis, Jr.,	Newtown Square.
Elk,	W. H. Johnston,	Benezett.
Erie,	G. A. Evans,	West Mill Creek.
Franklin,	Dr. B. L. Ryder,	Chambersburg.
Fulton,	B. C. Dawney,	Hustontown.
Huntingdon,	George W. Owens,	Birmingham.
Indiana,	J. T. Stuchul,	Indiana.
Juniata,	J. E. Jamison,	McAlisterville.
Lackawanna,	I. F. Tillinghast,	La Plume.
Lancaster,	L. S. Reist,	Oregon.
Lebanon,	Henry C. Snavely,	Lebanon.
Lehigh,	H. Leh,	Allentown.
Luzerne,	P. Sutton,	Exeter.
Lycoming,	A. R. Sprout,	Picture Rocks.
Mifflin,	Henry Ort,	Lewistown.
Montgomery,	E. Satterthwait,	Jenkintown.
Monroe,	R. F. Schwarz,	Analomink.
Montour,	W. M. Gearhart,	Danville.
Northampton,	A. S. Shimer,	Redington.
Northumberland,	William Voris,	Pottsgrove.
Perry,	M. B. Eshleman,	Newport.
Philadelphia,	Thomas P. Meehan,	Germantown.
Potter,	A. B. Mann,	Coudersport.
Schuylkill,	J. S. Keller,	Orwigsburg.
Snyder,	J. A. Kepler,	Mount Pleasant Mills.
Susquehanna,	Myron Kasson,	Montrose.
Tioga,	S. M. Baker,	Brookfield.
Union,	A. S. Sheller,	Lewisburg.
Warren,	W. Cowan,	Warren.
Washington,	Pressley Leach,	Burgettstown.
Westmoreland,	A. Ruth,	Scottdale.
Wyoming,	N. A. McKown,	Tunkhannock.
York,	Peter Lint,	York.

COMMITTEE ON NOMENCLATURE.

H. A. Chase, *Chairman*, Philadelphia.
J. Hibberd Bartram, Chester county.
Dr. J. H. Funk, Berks county.
H. A. Longsdorf Cumberland county.
J. T. Smith, Juniata county.

COMMITTEE ON ENTOMOLOGY.

S. S. Rathvon, *Chairman*, Lancaster co.
Ezra High, Berks county.
Herman Strecker, Berks county.

COMMITTEE ON ORCHARDING.

Col. George F. McFarland, *Chairman*, Dauphin county.
J. G. Engle, Lancaster county.
Jacob Heyser, Franklin county.
Edwin Davis, Juniata county.
John Hoffa. Northumberland county.

COMMITTEE ON FLORICULTURE AND ARBORICULTURE.

Charles H. Miller, *Chairman*. Philadelphia.
P. C. Hiller, Lancaster county.
John C. Hepler, Berks county.
George Achelis, Chester county.
W. P. Brinton, Lancaster county.

COMMITTEE ON ARRANGEMENT AND RECEPTION.

C. T. Fox, *Chairman*, Berks county.
John C. Hepler, Berks county.
E. B. Engle, Franklin county.

LIFE MEMBERS.

Bartram, J. Hibberd, Milltown, Chester county.
Brinton, W. P., Christiana, Lancaster county.
Bissell, W. S., Pittsburgh, (deceased.)
Calder, Rev. James, Harrisburg, Dauphin county.
Cornelius, Robert, Philadelphia.
Engle, J. G., Marietta, Lancaster county.
Engle, H. M., Marietta, Lancaster county.
Engle, E. B., Waynesboro', Franklin county.
Fox, Cyrus T., Reading, Berks county.
Garretson, Joel V., Flora Dale, Adams county.
Hayes, Charles P., 149 North Fifteenth street, Philadelphia.
Heyser, Jacob, Chambersburg, Franklin county.
Hildrup, W. T., Harrisburg, Dauphin county.
Hacker, William, Philadelphia.
Hoopes, Josiah, West Chester, Chester county.
Hiller, Casper, Conestoga, Lancaster county.
Hiller, Peter C., Conestoga, Lancaster county.
Landis, Israel, Lancaster, Lancaster county.
Martin, J. O., Mercersburg, Franklin county.
Pannebaker, William M., Lewistown, Mifflin county.
Reist, Peter S.. Lititz, Lancaster county.
Shaffner, Jacob, Harrisburg, Dauphin county
Swift, E. P., Mount Oliver, Allegheny county.
Thomas, George B., West Chester, Chester county.
Thomas, Edwin W., King of Prussia, Montgomery county.

HONORARY MEMBERS.

Barry, P., Rochester, N. Y.
Downing, Charles, Newburg, N. Y., (deceased.)
Ellwanger, George, Rochester, N. Y.
Garber, J. B., Columbia, Lancaster county, Pa., (deceased.)
Meehan, Thomas, Germantown, Pa.
Michener, Dr. E., Toughkenamon, Chester county, Pa.
Parsons, S. B., Flushing, N. Y.
Parry, William, Parry, N. J.
Rathvon, Prof. S. S., Lancaster.
Rowe, Hon. D. Watson, Chambersburg, Pa.
Rutter, John, West Chester, Pa.
Saunders, William, Washington, D. C.
Stitzel, Hon. George D., Reading, Pa.
Thomas, John J., Union Springs, N. Y.
Warder, Dr. John A., North Bend, Ohio, (deceased.)
Willets, Rev. Dr., Philadelphia.
Wilder, Hon. M. P., Boston, Mass.
Wickersham, Dr. J. P., Lancaster, Pa.

ANNUAL MEMBERS.

Achelis, George, West Chester.
Albright, William B., Reading.
Ancona, Hon. S. E., Reading.
Balderston, George, Colora, Cecil co., Md.
Bauer, Elwin, East Mauch Chunk.
Baer, J. C., Hamburg.
Bickel, Isaac, Reading.
Biddle, F. C., Chadd's Ford.
Breneiser, Charles, Reading.
Bruckman, George W., Reading.
Buck, Aaron R., Stouchsburg.
Burkey, Joshua R., Reading.
Brosius, W. H., Liberty Square.
Carter, John I., West Grove.
Chase, R. G., Geneva, N. Y.
Chase, H. A., 1430 South Broad st., Phila.
Cheetham, J. H., Reading.
Clous, W. J., Reading.
Cocklin, E. H., Bowmansdale.
Comfort, H. W., Fallsington.
Coover, Calvin, Bird-in-Hand.
Cocklin, Jacob, Shepherdstown.
Curwen, John, Jr., Villa Nova.
Davis, E. M., 205 Walnut Place, Phila.
Davis, Edwin, Thompsontown.
Dauth, George W., Reading.
Diffenderfer, F. R., Lancaster.
Dietrich, Levi F., Reading.
Derr, Cyrus G., Reading.
Donmoyer, M. T., Kutztown.
Eby, Simon P., Lancaster.
Edge, Thomas J., Harrisburg.
Eckert, Henry S., Reading.
Engle, Daniel G., Marietta.
Endlich, G. A., Reading.
Epler, John H., Conewago.
Eppihimer, Henry, Reading.
Ermentrout, Hon. J. N., Reading.
Eshleman, M. B., Newport.
Evans, Miller M., Reading.
Faust, J. B., 921 North Third st., Reading.
Fegely, Albert H., Reading.
Fisher, W. H., Reading.
Fox, E. S., Reading.
Funk, Dr. J. H., Boyertown.
Gaul, James W., Wernersville.
Geisler, C. W., Reading.
Getz, James K., Reading.
Goodhart, Reuben, Reading.
Gotshall, John, Reading.
Gerhart, Dr. T. S., Beckersville.
Geiger, Milton Z., Geiger's Mills.
Grant, Jeremiah K., Reading.
Greene, Dr. C. A., Harrisburg.
Greenleaf, Dr. R. P., Henry Clay, Del.
Griesemer, Charles A. Z., Reading.
Grover, Leverett, 412 Nineteenth st., Phila.
Gutshall, Col. John, Carlisle.
Haines, Henry C., Germantown.
Haines, John S., Germantown.
Harrison, A. W., 108 Queen st., Germantown.
Hart, Lane S., Harrisburg.
Hawley, Jesse G., Reading.
Hagenman, Hon. J., Reading.
Hartman, Frederick S., Tuckerton.
Heller, F. P., Reading.
Hendel, Henry B., Reading.
Hepler, John C., Reading.
Herr, Joel A., Cedar Springs.
Herr, Daniel D., Lancaster.
Hershey, Simon A., Landisville.
Hershey, W. L., Landisville.
Hertzler, S. M., Eberly's Mills.
Hiester, Gabriel, Harrisburg.
High, Ezra, Reading.
High, William R., Reading.
Hoffa, John, Milton.
Hylton, Dr. J. Dunbar, Palmyra, N. J.
Jameson, James, Reading.
Jacobs, J. H., Reading.
Jamison, J. E., McAllisterville.
Keim, Henry M., Reading.
Keim, Isaac W., Reading.
Keim, George W., Stouchsburg.
Keller, J. S., Orwigsburg.
Keller, Col. D. C., Reading.
Kendig, M. D., Creswell.
Kennedy, Prof. George, Beaver Falls.
Kenney, James R., Reading.
Kepler, John A., Mt. Pleasant Mills.
Kershner, George W., Reading.
Kerst, Amos, Reading.
Knabb, Jacob, Reading.
Koch, James, Reading.
Kready, John, Mount Joy.
Kraemer, Lewis, Stony Creek Mills.
Kuser, D. H. G., New Berlinville.
Lauer, George F., Reading.
Leh, H., Allentown.
Leonard, Maurice, Oakland Mills.
Lewis, Joseph, Jr., Newtown Square.

Leinbach, Joseph A., Reading.
Leinbach, George A., Reading.
Lovan, Cyrus, Jacksonwold.
Linn, John, Chambersburg.
Lint. Peter, York.
Linville, J. C., Gap.
Longsdorf, D. E., Mechanicsburg.
Longsdorf, H. A., Mechanicsburg.
McFarland, Colonel George F., Harrisburg.
McGowan, James, Geiger's Mills.
Maltzberger, H., Reading.
Marks, Levi, Reading.
Meehan, Thomas P., Germantown.
Meredith, S. M., Reading.
Mengel, Levi W., Reading.
Miller, Charles H., Mt. Airy, Philadelphia.
Mitchell, J. E., 310 York avenue, Philadelphia.
Moon, W. H., Morrisville.
Mohn, John G., Reading.
Moers, John F., Reading.
Moore, William G., Womelsdorf.
Moyer, John M., Beckersville.
Murdoch, Alexander, Pittsburgh.
Muhlenburg, H. A., Reading.
Musser, H. C., Schock's Mills.
Mumma, Isaac, Highspire.
Neischwander, Levi M., Hamburg.
Nimson, C. H., Allentown.
Niesley, C. B., Mechanicsburg.
Nolan, William, Reading,
Oberly, Erwin, Easton.
Ort, Henry, Lewistown.
Ort, Mrs. Henry, Lewistown.
Orth, John F., Reading.
Orr, Jesse, Reading.
O'Reilly, James A., Reading.
Pardee, General Ario, 237 South Third street, Philadelphia.
Phillips, J. W., Zelienople.
Phelps, George W., Reading.
Pyle, J. W., Willow Dale.
Quier, Levi, Reading.
Rakestraw, Thomas, Willow Dale.
Ralston, John, Reading.
Reist, Levi S., Oregon.
Reber, Henry C. G., Reading.
Reiger, Henry, Reading.
Rife, Jacob L., West Fairview.
Ritter, W. S., Reading.
Rupp, H. S., Shiremanstown.
Rush, J. G., West Willow.
Rollman, John, Lower Heidelberg.
Ruth, A., Scottdale.
Ryder, Dr. B. L., Chambersburg.
Ritter, Benjamin S., Jacksonwold.
Satterthwait, Edwin, Jenkintown.
Schaffer, Morris H., Reading.
Scherer, Reuben W., Manatawny.
Schook. Oliver D., Hamburg.
Schwarz, R. F., Anolomink.
Shearer, E. L., Tuckerton.
Shearer, Solomon, Vinemont.
Shearer, Christopher, Tuckerton.
Shearer, E. L., Reading.
Sherfy, John L., Gettysburg.
Shearer, Joseph, Reading.
Sheller, A. S., Lewisburg.
Sharpless, J. K., Catawissa.
Shimer, A. S., Redington.
Shoemaker, R. C., Jarrettown.
Shoemaker, W. A., Reading.
Seidel, Franklin, Maiden Creek.
Small, Samuel, Jr., York.
Smith, J. T., McAllisterville.
Smith, J. H., Cocolamus.
Snavely, H. C., Lebanon.
Smith, Dr. Aaron, Reading.
Smith, F. Leaf., Reading.
Smink, F. C., Reading.
Snyder, Solomon L., Reading.
Strunk, A. S., Reading.
Stauffer, A. K., Reading.
Stubbiebine, J. G., Morgantown.
Styer, Adam, Morgantown.
Stump, Henry W., Stouchsburg.
Thomas, Joseph W., King of Prussia.
Trexler, A. D., Trexler.
VanBuskirk, James, Pricetown.
Voris, William Pottsgrove.
Walter, Dr. Robert, Walter's Park.
Wanner, Amos B., Reading.
Wanner, Peter D., Reading.
Weiler. M. S., Reading.
Wickersham, R. A., Bendersville.
Willson, George B., Lancaster.
Witner, Joseph F., Paradise.
Williams, J. Savage, 79 Second street, Baltimore.
Wherry, S. M., Shippensburg.
Witner, George K., Reading.
Woods. T. A., Harrisburg.
Yates, D. G., 5774 Germantown avenue, Philadelphia.
Yocum, William, Douglasville.
Yoder, Joseph L., Bethlehem.
Young, William, Reading.
Young, John G. B., Reading.
Zeigler, Amos Shock's Mills.
Zerr, E. M., Geiger's Mills.
Zug, Allen W., Lititz.
Zerr, Jacob G., Geiger's Mills.

STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

The twenty-seventh annual meeting of this Association was held in the court-house at Reading, Pa., and was well attended, both by members and others, throughout all its sessions. The usual reports, both verbal and written, were made by chairmen of committees, and a number of able essays and spirited discussions united to make our deliberations varied and interesting. Probably the most prominent feature of the meeting, and deserving of special mention, was the large accession of new members from the city of Reading and county of Berks. Through the efforts of the President, George D. Stitzel, and Secretary Fox, of the Berks County Agricultural and Horticultural Society, over one hundred names were enrolled, and in recognition of their efforts in behalf of our Association, they were unanimously elected to honorary and life membership respectively. There was exhibited a fine, though not very large, collection of fruits, due mention of which will be made in these reports. Bethlehem was chosen for our next annual meeting. Quite an interest was manifested in the "fruit houses," for which Reading is noted, and as a committee was appointed to visit several in the city and report upon them, we may expect additional information on this subject at our next meeting.

THE MEETING.

Promptly at two o'clock, P. M., January 20, 1886, the Association was called to order by President Cooper, in court-room No. 2. Just on the eve of proceeding to active business, Hon. GEORGE D. STITZEL of Reading, ex-President of this Society, and president of the Berks County Agricultural and Horticultural Society, cordially extended the following

ADDRESS OF WELCOME.

MR. PRESIDENT AND GENTLEMEN: In behalf of the Berks County Agricultural and Horticultural Society, and in behalf of the citizens of Reading, I have the pleasure of extending to the State Horticultural Association of Pennsylvania a hearty welcome to our city and county. Indeed, we feel highly honored in having such an organization assemble in our midst. Several years ago, when I was an officer of this Society, after the adjournment of one of our annual meetings, I called upon the janitor in attendance at the hall to ascertain his charges. He said, "*Nothing at all;* what I learned during your sessions more than paid me for my trouble," and he added, "this was the most intelligent and best behaved body of men I ever saw; they even did not spit upon the floor." I afterwards learned that this same gentleman was also the janitor of a political club-room.

The people of the present generation have just such organizations as this to thank for the luscious fruits and fine vegetables they enjoy. When I was a boy, and I am sorry to say upwards of fifty years ago, we used to get up long before daylight in the grape season, walk eight or ten miles to Rockland township to gather grapes, and after we had succeeded in getting our clothes torn and our hands scratched, we returned with a basket or two of sour grapes. The only varieties we knew of in those days were the "fox" and "frost" grapes. Later on, German vintners came into this country, and brought with them the Isabella and Catawba varieties, which were a marked improvement on the wild kinds. Through cultivation and hybridization, the improvements in all kinds of fruits have been wonderful. I knew very little of the Pennsylvania Fruit Growers' Society, as it was then called, until in the winter of 1873, when they held their first meeting in Library Hall in this city, at which time I was enrolled as a member of the organization. From that time I have attended every meeting excepting one, when I was prevented by sickness in my family. At that time the Society had one hundred and eighty-three annual members, of which our county contributed fifteen, three of whom have since died, viz: Isaac Eckert, at one time president of the Berks County Agricultural and Horticultural Society, and quite a prominent man in this part of the State; John Fehr, one of the largest grape-growers and vintners in this section of the country, and Charles Kessler, who took great interest in horticulture, was quite a successful fruit-grower, and served as president of our county agricultural society.

In 1879, the Society met here again in Ritter's hall, when it had an annual membership of one hundred and fifty-three, of which number this city and county contributed thirty. Five of these have since died, viz: Alexander Burnett, superintendent of the Charles Evans cemetery, who prepared and read an interesting essay at that meeting on "Mulching;" Joseph L. Stichter, who always took a deep interest in the affairs of this Society, and entertained its members quite handsomely at their last meeting in Reading; Frederick Lauer, one of our most prominent citizens, who always was foremost in all public enterprises; Edwin Shalter, a member of the Berks county bar, and at one time the corresponding secretary of the Berks County Agricultural and Horticultural Society; also, Evan Mishler and Augustus C. Greth.

At this, "the third" annual meeting of the Society in this city, through the energy and perseverance of Cyrus T. Fox, secretary of our agricultural and horticultural society, we will add over one hundred names to the present membership of the State Horticultural Association of Pennsylvania.

President COOPER. I am much pleased with the generous reception accorded us, and I thank you for this cordial welcome. I will call upon Mr. Harrison to respond in behalf of the Association.

Mr. HARRISON. I do not know that I can add anything worthy your attention, and what I shall not say will probably interest you more than what I shall say. I can only add that I thank the President for the honor conferred, and also the good people of Reading and vicinity for the cordial welcome extended. I hope our Society may continue to grow and flourish, and go forward in the good work in which it is engaged.

Reading and approval of minutes of last annual meeting having been done, Mr. W. H. Moon, of Bucks county, was elected treasurer *pro tem.*

ELECTION OF OFFICERS.

President Cooper. I believe it has been the custom to refer this matter to a special committee.

Judge Stitzel. I move that a committee of five be appointed to prepare a list of candidates for the several offices.

Mr. Engle. I have sometimes thought that this method may not be satisfactory, as the committee virtually elects the officers.

Judge Stitzel. Has the gentleman a better method to propose?

Mr. Engle. I have not, but only referred to the matter to hear the sentiments of others.

Mr. Moon. I think, in order to save time, we had better proceed in the usual way.

Mr. H. A. Longsdorf. I think the method we have pursued heretofore is quite satisfactory. We have good officers, and different sections of the State are well represented.

President Cooper. The committee merely recommends. In case any changes are desired, they can be made by the Society.

Judge Stitzel's motion having been adopted, the following committee was announced by the chair:

Messrs. George D. Stitzel, chairman, H. C. Snavely, J. W. Pyle, A. W. Harrison, and H. A. Longsdorf.

Mr. Fox. I have here a list of one hundred and six names of gentlemen of Berks county who wish to connect themselves with the State Horticultural Association of Pennsylvania. The list comprises merchants, lawyers, judges, farmers, and citizens who wish to aid in the work in which we are engaged. I will read the list, and ask that they be enrolled as members of this Society.

President Cooper. With this accession of new members, it will probably be in order to name this the State Horticultural Association of Berks county.

On motion, a short recess was taken to give members an opportunity to pay their annual dues.

DISTRIBUTION OF ANNUAL REPORTS.

Judge Stitzel. Probably some of our members are not aware that a number of State reports are now bound in one volume, and the different agricultural and horticultural societies are entitled to a number of copies for distribution among their members. They contain six hundred to seven hundred pages, and cost about twenty-five cents per copy for mailing. Where members reside at isolated points, this expense cannot well be avoided, and postage should be forwarded to the Treasurer or Secretary. Where a number of members reside in the same locality, it is best to have all sent by express or freight to one of their number, who will receive and distribute them. Members will be duly notified by the Secretary when reports are ready for distribution.

Mr. Davis. Some members have already paid the necessary postage, and reports will be forwarded without further notice.

Mr. Moon offered the following, which was unanimously adopted:

Whereas, The success attending the acquisition of new members and the development of local interest in the meetings of this Association is unprecedented, and when it is considered that this increase is due largely to the personal exertion and active interest of Cyrus T. Fox, of Berks county; therefore,

Be it resolved, That this Association show its appreciation of this act by making Cyrus T. Fox a life member of the State Horticultural Association of Pennsylvania.

Mr. ENGLE. I think Judge Stitzel should also have been included in the resolution, and I move that he, too, be elected to life membership.

Mr. FOX. I desire to add an amendment to the motion just made; before doing so, however, I desire to heartily thank the members of this Association for their kind appreciation of my efforts. I take no credit to myself for the large accession of new members we have received here, but it is due to our progressive home organization, the Berks County Agricultural and Horticultural Society. We have here a society of which we are proud, and that holds monthly meetings that are as largely attended as this. I now ask to amend the motion by nominating Judge Stitzel for honorary membership, so that his name may be associated with those of Marshall P. Wilder, Dr. John A. Warder, A. S. Fuller, Thomas Meehan, and others. Judge Stitzel has for a number of years served as President of this Association.

The amendment was accepted, and Judge Stitzel was unanimously elected an honorary member.

ANNUAL REPORT OF THE SECRETARY.

To the President and Members of State Horticultural Association of Pennsylvania:

A brief review of the Secretary's work during the past year will, I trust, not prove uninteresting.

The increased size and consequent additional expense of mailing our annual reports was brought to the attention f this Society at its last annual meeting, and action was taken in reference thereto.

It was decided that henceforth members be required to pay, in addition to the annual fee of membership, the sum of twenty-five cents to prepay postage on reports. In accordance with this action, immediately after our adjournment last winter, I issued a circular as follows:

"STATE HORTICULTURAL ASSOCIATION OF PENNSYLVANIA.

"DEAR SIR: The annual report of this Association for 1884 is now ready for distribution to members. At our annual meeting, January, 1884, held at Harrisburg, it was decided by a vote of the Association that henceforth the complete volume of 'Agriculture of Pennsylvania' be accepted from the State for each member, instead of the partial, or 'Horticultural' report, as has been customary heretofore. At our last annual meeting, held January 21 and 22, 1885, at Lancaster, the question of mailing these large reports was discussed, and the Sectary was directed to inform members of the change, and request them to forward the necessary stamps for pre-payment of postage.

"'Agriculture of Pennsylvania' is a large illustrated volume of six hundred and fifty pages, bound in cloth, and contains, in addition to the reports of our 'State Horticultural Association,' reports also of 'Pennsylvania Board of Agriculture,' 'Pennsylvania Dairymen's Association,' and 'Pennsylvania State College.' It is a volume replete with useful information for all, and especially to those engaged in agricultural and horticultural pursuits, and is worth many times the fee of annual membership, which is but one dollar, in addition to the postage.

"These reports are now in my hands, and will be promptly mailed on receipt of twenty-five cents for postage. Where several members, residing in the same locality, will club together, they can be sent more cheaply by express, payable upon delivery. Please let me hear from you promptly.

"E. B. ENGLE,
"*Secretary.*

"WAYNESBORO', FRANKLIN COUNTY."

I received prompt responses from nearly all, the exceptions being a few of those who had remitted their annual dues to the Treasurer before my circular was issued. Those who were present at the meeting, and to whom the reports were delivered in person, were, of course, not expected to pay the additional charge. Neither did I deem it the sense of our members present that such solicitation should be made of our honorary members, and their reports were duly mailed, as heretofore, at the Society's expense.

During the year, I have sent to societies in other States, in exchange for similar reports, seventy copies of our report for '83 and '84, and have received about as many, in the aggregate, from Kansas, Indiana, Illinois, Ohio, Missouri, Michigan, Maine, New Jersey, and Canada. Most of these were sent direct to our Librarian at Harrisburg, and have been filed in our library.

Exhibit at the State Fair.

A committee, consisting of the President and five members of this Association, was appointed at our last annual meeting to arrange for an exhibit of fruits in connection with the fair of the Pennsylvania State Agricultural Society. Although circulars were sent to every member of our Society soliciting contributions of fruits, but few responded, and the display was not as large as united action on the part of all would have made it. By the aid of the very extensive and complete exhibit made by Mr. Satterthwait, we were still able to secure the first award for largest and best display, and a few lesser premiums. I would respectfully urge more attention to these exhibits on the part of our members, as a little effort on the part of all will make our success certain. I hope we will have from members of the committee a full report of their work. An effort has been made, and will continue to be made, to induce the State Agricultural Society to make a few changes in their premium list, which, without impairing the value or efficiency of any exhibits, will aid materially in a fair and equitable awarding of premiums.

Delegates to American Pomological Society.

An effort was made in naming this committee to secure representatives of our Society who were not also members of the American Pomological Society. Although not entirely successful in naming such a committee, it is but just to say that we were very ably represented at Grand Rapids, and a report from the chairman of said committee will, no doubt, be presented during our sessions.

Publication and Distribution of our Annual Reports for 1885.

I very much regret that I am obliged to announce to this Association that our reports for 1885 have not yet been printed, and will not be ready for distribution for some time. This is, I believe, the first annual meeting we have held in ten years that our reports have not been either mailed before we convened, or were on hand for distribution at our meeting. I regret especially that we have not sufficient copies, at least, for all members who have come to our annual meeting, and who could be conveniently supplied without the additional expense of postage. For convenience in filing, and for the sake of uniformity with our former reports, some of our members have expressed a preference for copies of our proceedings bound separate and apart from other State reports. I would state for the information of such, that, if application be made at the proper time, they can be supplied in that form. I would suggest that, at all events, a certain number—say, fifty or one hundred copies—be issued in that shape every year for such as prefer them, and for exchange with societies whose proceedings are published in similar form and size.

It affords me pleasure to report an increased interest in the work of our Association, not only in our own, but in other States. This is shown by the frequent inquiries received for copies of our reports, our steadily increasing membership, and the fuller attendance at our annual meetings. Much praise is due the efficient chairman of our General Fruit Committee for the very successful work he has already done, and is still doing, to secure reports from counties hitherto unrepresented in our Association. Great credit is also due him and his fellow-members of the Committee of Arrangements here for the satisfactory manner in which all the arrangements for our meeting have been conducted, and especially for the large list of new members that has been received, mainly through his efforts.

In conclusion, I think we have ample cause to congratulate ourselves that the gospel of horticulture, of delicious fruits, of beautiful and fragrant flowers, and of pleasant and attractive homes, is gaining new converts every day. We must not overlook the fact that, through our public schools, the minds of the young are being imbued with an interest in this good work, and they will eventually look forward to the coming "Arbor days" as among the most pleasant and profitable of their youthful anticipations.

Thanking you most cordially for the oft-renewed expressions of your approval and confidence, the foregoing is respectfully submitted.

E. B. ENGLE,
Secretary.

On motion, report was accepted, and the Secretary was authorized to accept annually fifty copies in pamphlet form.

The SECRETARY. If we continue to receive such large accessions to our membership, we will be obliged either to ask for a larger quota of reports or send out fewer copies in exchange. Our allotment now is three hundred copies. Some of our sister societies have been sending us ten copies annually in exchange, and I have thus far tried to send an equal number of ours. I am afraid we cannot be as liberal in the future, unless we can get more reports from the State.

Mr. FOX. The act authorizing the distribution of these reports allows this Society annually three hundred copies. It allows, also, one hundred copies annually to the "Pennsylvania Horticultural Society."

There is in Philadelphia an organization with said title, but its proceedings are not published by the State, and it has never claimed any reports. I have no doubt the one hundred copies referred are also intended or available for our Society.

REPORT OF LIBRARIAN.

The following was read and accepted:

HARRISBURG, PA., *January 19, 1886.*

To the State Horticultural Association of Pennsylvania:

GENTLEMEN: As the Librarian of the Association, I have the honor to report the following additions to our library during the past year:

Annual reports of the

Michigan Horticultural Society, 1883,	10	volumes.
Michigan Horticultural Society, 1884,	10	"
Kansas Horticultural Society, 1883,	3	"
Kansas Horticultural Society, 1884,	10	"
Missouri Horticultural Society, 1883,	2	"
Missouri Horticultural Society, 1884,	10	"
Massachusetts Horticultural Society, 1883,	10	"
Massachusetts Horticultural Society, 1884,	8	"
Massachusetts Horticultural Society, 1885,	6	"
Agriculture of Pennsylvania, 1884,	7	"
Total addition during the year,	70	"

The library now consists of sixty-four bound books and one hundred and twenty-five pamphlets. The expenditures have been as follows:

Express charge on books from Detroit, Mich.,	$1 30
Express charge on books from Boston, Mass.,	70
Express charge on books from Missouri,	1 00
Express charge on books from Kansas,	1 00
Total expenses during the year,	$4 00

Respectfully submitted.

THOMAS J. EDGE,
Librarian.

Report of the General Fruit Committee being next in order, Chairman Fox asked that its reading be postponed until evening session. A motion to that effect was made and adopted.

Report of Committee on Orcharding and of delegates to American Pomological Society were also postponed to subsequent sessions.

EXHIBIT AT STATE FAIR.

President **COOPER**. As a member of said committee, I was instrumental in having a number of specimens sent to the State fair, but have never heard what disposition was made of them.

Mr. **HIESTER**. I was a member of the Committee on Awards, and recollect that much of the fruit was decayed when examined.

Mr. **ENGLE**. I went there in person with specimens of apples, pears, and other fruits, but found the building partly without roof or windows, tables not ready, and no place to display my exhibit. Don't know what disposition was made of it.

President **COOPER**. Would it not be well to appoint a committee to prepare business? I believe that has been the custom heretofore.

Judge **STITZEL**. I doubt whether this will be necessary. The trouble is, we generally have too much business. When reports are read and the question-box examined, we will no doubt have sufficient work on hand.

TOPICS FOR DISCUSSION.

The following list of topics was read from the programme by the President:

1. How can we irrigate economically?
2. Retarding or refrigerator houses. What are the latest and most scientific methods of construction?
3. Are our best and most valuable fruits accidental seedlings, or the result of crossing by design?
4. Weeds. What is their use or mission in the economy of nature?
5. Grapes. What of the newer varieties? Should the use of paper bags be encouraged?
6. Strawberries and raspberries. What is the experience of the past season with the new varieties?
7. Plums. Are the "Wild Goose" and similar varieties of the "Chickasaw" type proving satisfactory in Pennsylvania?
8. Flowers. What six annuals are most desirable and easily grown?
9. What six perennials can be recommended for beauty and general planting?
10. What ten deciduous hardy shrubs are most desirable and easily cultivated?

Col. **MCFARLAND**. How about the "Wild Goose" plum? I would like to have the seventh question discussed.

Mr. **HIESTER**. Mr. Longsdorf has had some experience with this plum, and I would be pleased to hear his views.

Mr. H. A. **LONGSDORF**. I have never discovered any merit in the "Wild Goose" plum, and the kinds that are grown in our locality under that name are, generally speaking, an unmitigated fraud. I would not advise any one to plant it unless he can get nothing better. I am told, however, that there are a number of varieties or types, and that some are worthy of cultivation. They do better in the West than here, and are popular there because our finer varieties of plums cannot generally be grown there.

Mr. **HIESTER**. I don't know whether the variety I am growing, and which I procured from Hoopes Brother & Thomas, is the same as those referred to by Mr. Longsdorf, but they are certainly doing well in our locality. We planted some twenty or twenty-five trees in 1871 or 1872, and since they have commenced bearing, they have missed but one crop. They sell readily at ten to fifteen cents per quart, and are the most profitable plum on the place.

Col. **MCFARLAND**. I am aware that Mr. Hiester has been growing Wild Goose plums successfully for years, and selling them at ten to fifteen cents per quart, while I am within a stone's throw of his premises, and have trees that have never borne. My trees are thrifty and fine, some on plum, some on peach roots, but they will do anything but bear fruit. I have, to all appearances, the same soil and conditions.

Mr. **ENGLE**. I evidently have the same variety that Mr: Longsdorf has. The term "Wild Goose" as applied to plums is very indefinite, as I think there are nearly as many varieties as trees. My trees have fruited some, but very sparingly. They bloom profusely, but are said to be deficient in pollen. It is claimed by some horticulturists that they should be planted near other varieties to be properly fertilized. As to quality, they are hardly fit for eating out of the hand, but are desirable for preserving. "Richland" is our surest and best bearer. Have also fruited "Bassett's American," but it is too small, about the size of an ordinary cherry. Have also "Weaver," "Miner," "Moreman," "Blackman," and others. "Blackman" is, without exception, the finest grower I have ever seen. If it could be induced to bear, it would be a great acquisition.

Mr. **LONGSDORF.** I have been told that Mr. Hiester's Wild Goose plums must be marketed the same day they are picked. This is not the case with Western varieties. I know a gentleman near Clinton, Missouri, who had one season three hundred bushels, and who shipped them readily to Chicago, Cincinnati, and Pittsburgh.

Mr. **DAVIS.** I called on a neighbor last fall who had some fine plums, which were labeled "Wild Goose." They never bore until trees were whitewashed, and when the annual whitewashing was neglected, they failed to have a crop. Would whitewashing have such effect?

Mr. **ENGLE.** I don't think whitewashing the stems would induce trees to bear. Trees occasionally take a rest, whether whitewashed or not.

AMERICAN POMOLOGICAL SOCIETY.

Mr. **MOON**, one of the delegates to the last biennial meeting of the above society, submitted the following, which was accepted:

"The few representatives of this Association who persevered in starting for Grand Rapids, Michigan, the last place of meeting of the American Pomological Society, can report that their trip was *grand*, though at some points not very *rapid*. That they were kindly received and well entertained; that they found their meeting to be in a grand city located on the rapids; and that they found there a large assemblage of eminent pomologists and horticulturists from all sections of the Union and Canada, and even a representative from Japan. They also found a grand exhibition of fruit and horticultural products gathered from the central tier of States, largely through the east, west, and south. All assisted in making the exhibition magnificent and creditable to those interested in its management.

"First in regard to the exhbitition of fruit. The skating rink of the city, for the time being, was given up to this exhibition, and though a large hall, it was well filled with one of the finest fruit exhibits we have ever seen. To give you some idea of the interest this exhibition aroused among the citizens, as well as the rural population, we would say that this large hall was crowded every evening and well filled during the entire day, by those who were there from an interest they felt in these exhibits, and a desire to gain knowledge and information in regard to fruit-growing. When the following statistics are given, this interest can be more readily understood, and will also help to show you the strong claims presented by the State of Michigan in inviting the national society to her borders, to hold the biennial session. The statistics for 1884 report in the State of Michigan: 211,009 acres in apple orchards; 14,600 acres in peach orchards; 5,000,000 bushels of apples sold in 1884; 199,952 bushels of small fruits sold in 1885; number of societies devoted to horticulture in the State, 39.

"The display of fruit was generally of fine quality and appearance, though some varieties, familiar to us here in the East, were hardly recognizable there, notably, the Keiffer pear, which was in Michigan a poor insignificant fruit, about like a half-grown green Lawrence. As a whole, we did not think the pear exhibit very remarkable except for thr large display made by M. P. Weidner, of Boston; Ellwanger & Barry, of New York; and H. M. Engle & Son, of our own State, to whom the entire credit of sole exhibitor of fruit from our good Commonwealth was due. The Lawson and *Nee* Comet pear was on exhibition in all its beauty and magnificence from cold storage in New Jersey. The display of beautiful apples from Michigan and vicinity was very fine. In striking contrast with the large and handsome fruit, were exhibits of Siberian crab seedlings from Minnesota, as being the only varieties likely to stand their severe winters. Plums, for which the State of Michigan is so noted, were displayed in abundance, but not of that superiority that one might expect, caused, we were informed, by the trees being too heavily laden. Had they the ravages of curculio that we have here this trouble might be overcome. Grapes were fine in quality, though not very abundant in quantity. The new Woodruff Red, with its luxuriant growth and strong leathery foliage, was on exhibition, and surely seemed as if it might be adapted to latitudes farther north than where other better grapes will thrive. One exhibition, rather novel to us of the North, was a collection of cocoanuts, taken from the trees before maturity, while they were yet in the soft state; these, with numerous photographs, conveying to the minds of those who had never seen this fruit in its native clime a better idea than could otherwise have been formed. Japan persimmons, pomegranates, figs, and peanuts were all representatives of a southern clime.

"The exhibition, as one of a collection of fruits, was very effective, but, save a few wild flowers, the horticultural adornment of artistic floral designs and handsome flowers of modern introduction, usually so blended with our exhibts of fruit here in the East, were manifestly wanting; showing full well that expenditure for these, the luxuries of life, are not so common as with us.

"The meetings of the American Pomological Society were presided over by Patrick Barry, of New York, in the absence of the venerable president, the Hon. Marshall P. Wilder. The addresses of welcome to the city and State were very expressive and cordial. The discussions of the American Pomological Society are apt to dwell largely on the topics of interest to the locality of which their meetings are held. Thus the hardiness of apples in a meeting in Philadelphia and Baltimore would be of but little interest where all apples are hardy. But in Michigan, where, in the extreme north, the thermometer varies at times from twenty to thirty degrees below zero, and in Minnesota, where even a colder climate exists, the question of the hardiness of apples is a very important one, and the discussion of this topic probably consumed two or three hours, and enlightened some of us who consider all apples hardy in our climate. The Fameuse, Ben Davis, and a few others are hardy in northern Michigan, while in reference to Minnesota, the statement was made that no variety, without the Siberian crab being in it, can stand the extremes of their climate; but from such seedlings as they have produced from this strain some veteran horticulturists have made apple-growing a success there. Some very interesting experiments with pear blight, the effect of inoculation as practiced by Prof. Arthur, of the New York experimental station, were explained to the society by that gentleman, and the results of his experiments, as far as they have gone, were very interesting, and give promise of being of great value in the near future, when we may deem it as important to vaccinate our pear trees to prevent pear blight as we do our babies to prevent smallpox. The reports of those who took part as exhibitors or as delegates to the World's Exposition at New Orleans last winter, were somewhat varied and interesting, but generally the reports, while admitting it to have been a magnificent display, showed that more had been attempted and promised than could well be performed, and consequently innumerable perplexities and annoyances were the experience of nearly all who took part therein. Many other subjects of interest were discussed in a lively manner, and altogether I believe the meeting was voted a grand success, and broke up with the best of feeling, adjourning to meet in Boston in 1887."

Mr. ENGLE. I might add, in addition to Mr. Moon's able and interesting report of said meeting, that there were over four thousand plates of fruit exhibited in the hall. Among foreign fruits that were specially interesting, were specimens of Alligator pears and Mangos from Japan.

Mr. HARRISON. I also had the pleasure of attending the meeting at Grand Rapids, and can heartily indorse what has been said concerning it. The discussions were able and of more than ordinary interest, and the display of fruits was unusually large and attractive.

Mr. FOX. I have before me an essay by Mr. Phillips, of Zelienople. He is a member of our General Fruit Committee from Butler county, and has sent me a very able report. If in order, I will read it.

MR. PHILLIP'S ESSAY.

When last winter's snow took its departure, and the smiles of spring began to play around us, it proved to our farming fraternity that the wheat was indeed killed. This placed a damper upon the people and caused a stagnation of business, for you could see famine depicted in every countenance. The cry went forth, "We will indeed suffer," and every available nook and corner of the farm was sown in the old time substitute, and for which old Butler county is famously noted, "Buckwheat." The crop was good and you could see a change gradually creeping over the countenances of our many husbandmen.

A Great Apple Crop.

During all this time, Dame Nature, unnoticed, was doing all in her power to make amends for the previous loss. The apple trees bloomed, the apples shaped and grew, and no one interfered, for every one was too busy thinking of the past or watching the buckwheat grow. Finally, the fact began to dawn upon the minds of the many that we were going to have an extremely large crop of apples, more than ever before known. Then went forth another cry: "Such a crop; why, we won't get five cents per bushel, and that won't pay to bother about." Another was that "we will have all this year and none next." Well, after a time a New York firm came into this section and bought the apples, paying from twenty-five to thirty-three and a third cents per bushel under the trees. This was considered a God-send, and the smile changed to a broad grin. The fruit was not large, but smooth and perfect, and the Baldwin, Belleflower, Fallawater, Northern Spy,

R. I. Greening, Roxbury, Russett, and the Ben Davis brought the best prices.

Advantages of Northern Situations.

I have observed in my travels through the Connoquenessing Valley, that the orchards situated on the north side of the slope are nearly always well laden, and I have also noticed just the reverse of those situated on a southern slope. My theory of this is that those facing the south are killed in the bud. The warm sunshine thaws the frost out of the ground and the warmth swells the buds, so when a cold sleeting rain comes it invariably does its work, and those on the northern slope have not matured as fast, and are not in as great danger. Although this theory did not prove true in reference to our peach crop, which was an entire failure.

A Hint in Regard to Apricots.

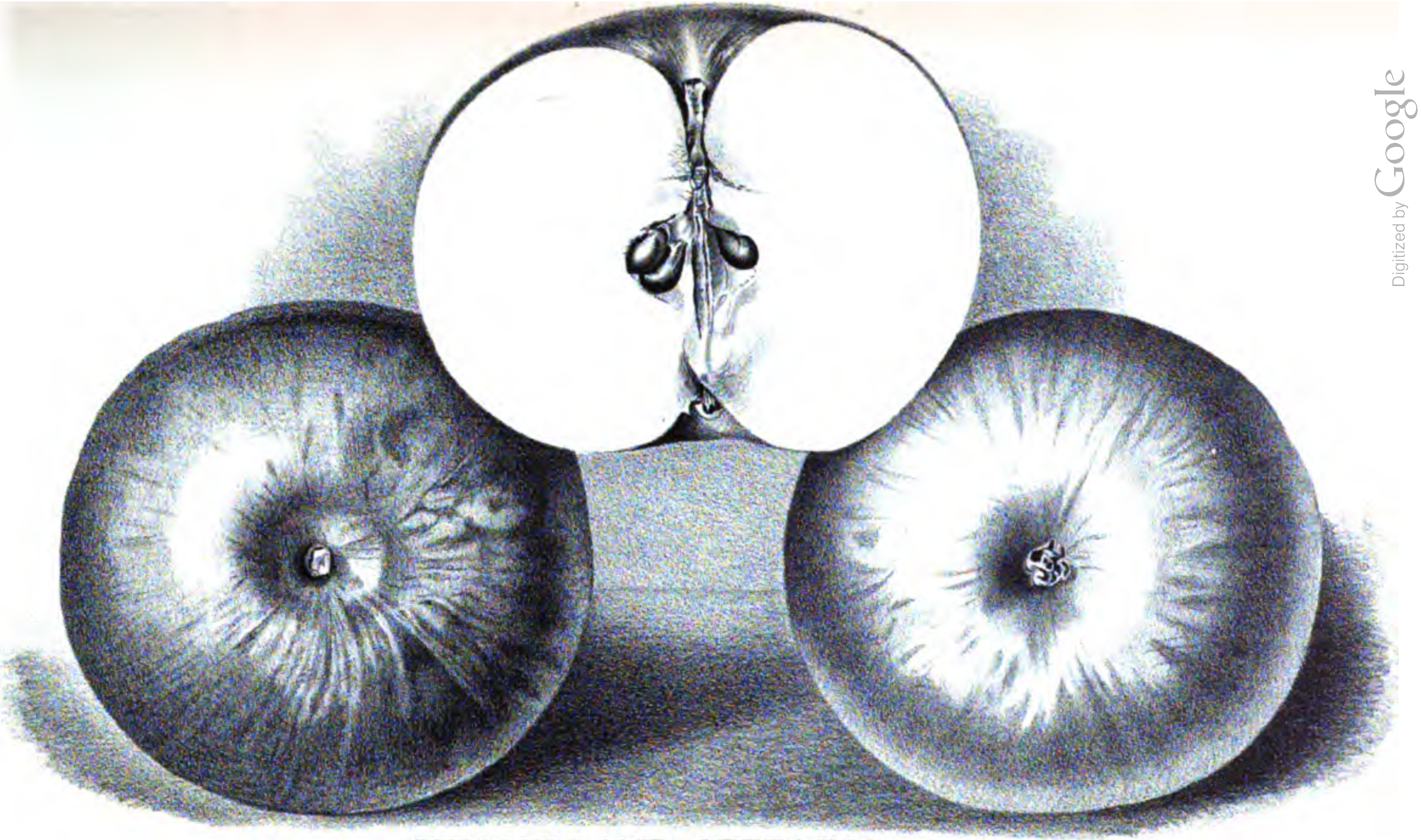
A friend of mine had a very fine apricot tree in his garden, but it never bore any fruit. The cause could not be guessed, as very great care was taken of the tree, but to no effect. At last, by accident, a remedy was found. During the winter, the children got to building a snow man in this same garden, and built it near this tree; also a snow fort around the tree. A partial thaw came, and the snow was formed into ice; but this was not discovered for several weeks. It was then supposed to be too late to remedy the matter, and, as it had never borne any fruit, no one fretted. Well, when the warm spring days came, the tree was very slow to put forth its dress. Finally, it came with blossoms and a nice yield of fruit. The next winter it was renewed, but this time by the owner, and, as long as he resorted to this method, he had plenty of apricots, and the mystery was solved; and I tried the same process with other fruits. It was, in almost every instance, successful, for it is a self-evident fact that, as long as the cold ice is lying about the roots, the buds will not swell, and the sleet, which is the death of our fruit crop, will not affect them.

Neglect of Small Fruits.

It must be acknowledged that our people are very far behind in the way of growing fruits, although an interest is how beginning to form in embryo to raise the raspberry. I predict, as was the case with the grape, a failure, from the fact that proper care was not taken of the vines, and the fruit was not marketable.

A Plea for Special Crops.

It is a self-evident fact that "too many cooks spoil the broth," and a man cannot, with profit, attend too many irons. You must, in order to make horticulture and agriculture pay, when you are working them together, have a crop come in when your fruit does not need attention; and this is seldom the case. Now, what I would like to impress upon our people is that they should divide up their crops. Let a few, for instance, take horticulture, some agriculture, some stock-raising, and so on. Unless this is done, none will be successful. Each tradesman must follow his own line, and he makes this his study. He is a success, and when you look upon our most successful farmers, they have become such by the study of one branch alone. The future of



CUMBERLAND SEEDLING.

Origin, Cumberland Co., Pa. Introduced by David Miller. Fruit large, considerably depressed; skin yellow ground, nearly covered with stripes and splashes of bright red; flesh, whitish yellow, tender and juicy; acid, but pleasant flavor. Ripens in September.

our country depends on the tillers of our soil, and they must, like other tradesmen and business men, make one line or branch a special study to be successful. Now, this is just what is needed in this section. The farmers think they raise wheat, rye, oats, corn, potatoes, stock, poultry, and fruits of various kinds, and, of course, only failure in all is the result. Can we not, as an Association, by continually bringing this subject before the people, cause a revolution in this State ? I am, indeed, anxious to hear from others on this subject.

Mr. **DAVIS**. There is one portion of the essay with which I cannot agree. If farmers would confine themselves to one crop, or even a special line of crops, few would succeed. Any crop is liable to fail, and it is best not to confine our efforts to the raising of wheat, or buckwheat, or apples, alone. Better grow a variety of crops, and, if one fails, others may succeed.

Col. **MCFARLAND**. Fruit-raising, as a business, may be so conducted as to absorb our time very closely. I think the time is coming when every lot-holder will have trees and small fruits about his place. The trouble is, too many of our farmers take no interest whatever in horticulture. They will pass a tree half dozen times in a day, and take no notice of it whatever. They do not read enough, and, when good agricultural papers are so cheap, the wonder is that they are not more generally taken and read.

Mr. **ZERR**. We are all aware that when a good crop of fruit or grain has been taken from the soil, certain ingredients that have been exhausted should be replaced. I would like to ask what is considered the best fertilizer for apple trees ?

Judge **STITZEL**. I consider wood-ashes the best and surest fertilizer for apples that can be had. They should be applied around the stems of the trees in the fall, and leveled down or spread in the spring. Would put two to three quarts to young, when planted, and more to larger trees.

Mr. **SNAVELY**. My experience is that unleached wood-ashes should be used with caution. Two years ago I lost about two hundred and fifty trees in that way, a heavy rain having followed their application, which produced lye, and destroyed the trees.

Judge **STITZEL**. The ashes I have used are from spent tan-bark. Have never noticed any injurious results.

Mr. **ZERR**. Some six years ago, I made a liberal application of ashes from spent tan-bark to my apple orchard. The following year I had a large crop of apples. I made a second application of ashes, and had a second crop of fruit, but since then have had no such success. I plowed my orchard, and probably injured it by cutting off the fibrous surface-roots.

Mr. **TREXLER**. Some of our farmers use spent tan with success. It is usually applied in the fall, and is placed under the trees as far as the roots extend.

Mr. **MONTFORT**. Would not an application of muriate of potash be good for trees ?

Mr. **ENGLE**. Wood-ashes are a valuable fertilizer, as they contain considerable potash. With us, however, they are scarce and hard to get, and we must apply potash in other forms. Kainit contains twelve to fourteen per cent., and muriate of potash fifty per cent., so that we can probably get it cheaper in the last-named shape than in any other way. While potash is one of the most valuable fertilizers for fruit trees, phosphorus and nitrogen are also necessary. In order to apply fertilizers properly and judiciously, we should know what ingredients are lacking, and most needed in our soils. One word more in reference to a statement in Mr. Phillips' essay, read by Mr. Fox. I believe the essayist claims that fruit is usually frozen when icicles form on the trees, or when the branches are encased in ice. I have never, in my experience, known fruit to freeze in that way. I think it is much more likely to be frozen by "hoar frost."

Mr. RUSH. I have found tobacco stems and refuse a valuable fertilizer for trees. They can be bought at five dollars per ton in our county.

Mr. MOON. They may do for Lancaster county, but a gentleman living near me, in Bucks county, applied tobacco stems, and lost two hundred trees. At least no other cause could be assigned.

Capt. MOORE. I would like to inquire of Mr. Rush what quantity it is safe to apply.

Mr. RUSH. Say ten to fifteen pounds around or near each tree. I tried muriate of potash, and lost a number of trees. Lime was also found injurious.

Mr. MOON. The gentleman to whom I referred used tobacco stems. They were carted among the trees and the ground thoroughly covered.

Mr. COOPER. I have no doubt Mr. Moon's friend applied the tobacco stems too heavily. I have had considerable experience with them, and have found them satisfactory, and valuable for peach and apple trees.

Dr. GERHART. Is Mr. Moon sure that the injury to the trees referred to was caused by the tobacco stems? It might have been owing to other causes, which I think is more than probable.

Mr. GOTTSHALL. Has any one used shoemakers' scraps, and with what success?

Judge STITZEL. Have used them with good success. Many excellent fertilizers of this kind are wasted in our cities.

Mr. SNAVELY. How much muriate of potash is it safe to apply to the acre?

Mr. RUSH. I applied about one ton muriate of potash, and one ton of South Carolina rock to six acres, spreading it under the trees. This application killed a number of trees, but it was probably owing to my having plowed away from the trees, and exposing the roots before the application was made. I plow alternately to and from the trees.

Mr. ATKINSON. I have applied at least twice that quantity to four-year-old peach trees with advantage. Still, by plowing away from the trees, and exposing the roots, the application referred to by the last speaker may have been too direct. Trees also may be injured by too heavy mulch. I would avoid stable manure on peach orchards, on account of fungus and tendency to heat. In regard to ashes from spent tan, have used it on my crops very cautiously, and have not been able to receive any special benefit. Applied it at the rate of two hundred bushels per acre. Had sample of ashes from red and black oak bark analyzed at Harrisburg, and the value was estimated at two dollars per ton. This sample was dry. If wet, they would have still less value.

Col. McFARLAND. It is evident that the trouble arises mainly from a want of knowledge of what the soil needs. If we can ascertain just what ingredients are wanting, we can act intelligently and manure judiciously. We are going too much in the dark. True, doctors don't always succeed, but they usually bury their mistakes.

Mr. **Davis**. My experience in peach-growing is, that the more we cultivate, the more thrifty our orchards are, and the better our crops. We have in Juniata county a gravelly soil, underlaid with clay and soapstone. Last winter it was eleven degrees below zero, and we had a fine crop. We claim that our trees will stand ten to twelve degrees below zero and bear fruit.

Mr. **Hoffa**. I have an elevated location for peaches that never misses, and have had fruit with the mercury sixteen degrees below zero. Last week the thermometer indicated twenty-two degrees below zero, and I expect peaches next season.

Mr. **Engle**. I would venture the assertion that where the orchard is situated, the mercury did not fall to sixteen degrees below zero. There is generally a difference of three to five degrees on cold nights, in favor of elevated positions. They are less subject to extremes, being colder in daytime and warmer at night.

Col. **McFarland**. Is not the temperature influenced by the amount of moisture in the air? Trees, like individuals, can withstand cold better when the atmosphere is dry than when moist.

Mr. **Longsdorf**. Much depends upon the seasons of the year that we have cold weather. Trees will bear more cold without injury in early winter than later or toward spring.

Mr. **Atkinson**. It is not the degree of cold so much as other conditions of growth, moisture, etc. Sometimes zero will destroy peach buds, and I have seen a temperature of fifteen degrees below, and had the finest crop of "Crawfords" I ever had, but there was very little wind or moisture. I don't think water frozen on the branches will injure the buds, but after damp, foggy weather they are very easily frozen.

Mr. **Lint**. I never knew fruit to be frozen by ice on the trees.

Mr. **Satterthwait**. May I ask what question is before the meeting? We ought to confine ourselves more closely to the subject under discussion.

Mr. **Hiester**. We are discussing the essay just read, and I think the point he made, and to which objections were urged, is well taken. To succeed we must find what fruits do best in any locality, and make them a specialty. We need more accurate information, and this can only be gained by experiments and careful observation. Our tree men carry too many chromos; if they carried less chromos and more tracts, they would do more for horticulture.

President **Cooper**. These discussions are a little rambling, and I hope the members will assist in transacting our business as much in order and as expeditiously as possible.

It is now after five o'clock, and before adjournment we should fix the hours for evening and other sessions. It has been customary to have a "Query Box," and one will be supplied this evening.

Adjourned to half past seven, P. M.

EVENING SESSION.

Having called the meeting to order, President COOPER read his

ANNUAL ADDRESS.

To the Members and Friends of the Pennsylvania Horticultural Association:

GENTLEMEN: It is with feelings of some regret that it becomes my duty to address you at this the twenty-seventh anniversary of the State Horticultural Association of Pennsylvania. I would much have preferred that the honor conferred upon Lancaster county, in giving it the presidency of this organization, had fallen on a much more deserving citizen, and one better able to officiate than your humble servant. When I reflect how many others there are among you who could fill the position with credit to themselves and honor to the Society, and who, too, are much more worthy, I cannot but think you have made a grave error in conferring the duties upon me. But since you have so ruled, I will endeavor to serve you as best I can, trusting to have your cordial assistance and coöperation in making this meeting both entertaining and instructive, and hoping all will rejoice, after the adjournment, that the two days' sessions in the city of Reading were among the best in the history of the Society. Little did we think, twenty-seven years ago, when the little band met in the side room of the Cooper House, in the city of Lancaster, that it would have grown to a State organization. But it only serves to remind us of the old adage "from little acorns tall oaks grow," and this may now be considered, (although but a little over a quarter of a century has elapsed since its birth,) the mighty oak in the forest of horticulture.

Have we made any progress in the work, is a question for our observing brethren to answer. Notwithstanding the many obstacles and enemies encountered, the untiring zeal of the horticulturist is ever on the alert to overcome all impediments to success. The thought has frequently occurred to me, that our insect pests are largely on the increase. Prohibitive laws for the protection of insectivorous birds, and the importation of others, seem to have had a tendency to increase, rather than annihilate, the great enemy to successful fruit-growing. Look where we will, we are confronted with an army of depredators waiting to devour that which we set the greatest store by. Is it any wonder that these repeated discouragements sometimes check our enthusiasm in the most healthful, useful, and interesting industry of our people?

The growth of fruits, vegetables, and flowers always attract the hungry and those having an eye to the beautiful. The ragged urchin on the wayside will risk the attack of a ferocious dog for a taste of the luscious strawberries just over the fence. The industrious mechanic, as he passes to and fro, will deflect his course by a neighboring orchard in the hope of getting a taste of the tempting fruit hanging in bright clusters over the trees. The man of leisure, sometimes called gentleman, occasionally breaks the rule of propriety and transgresses to obtain that coveted peach just beyond the public domain. I venture the assertion there are none among us but can recall the time when the temptation to transgress had almost got the better of conscientious sense of judgment, to obtain the fruits of our neighbor's garden or melon patch. Well do I remember the raids made by some mischievous boys to a neighboring hill, where flourished, with but little care, a large peach orchard, which but rarely missed producing a remunerative crop, and, indeed, were often loaded with the most luscious fruit. But these are days of yore. The work of the horticulturist is not blessed, at this day, with such bountiful crops, except in the most favorable locations, and then, too, with his constant care and watchfulness.

We meet this year in a county noted for its coal and iron industries, but which is no less a producer of fine fruits also. Berks has many situations well adapted, and which are now producing abundant crops of health-giving horticultural products, in a measure largely supplying its markets from its own soil. The increasing demand for home-grown fruit is, I rejoice to say, a strong incentive for greater exertion and more vigilant care and observation on the part of our home gardeners. The superior excellence of well ripened and freshly picked fruit and vegetables, to the often bruised, wilted, specked, and stale articles found on the stands and wagons of the green grocer, is rapidly convincing the consumer of their superiority to that shipped from distant lands.

If I mistake not, this county is entitled to the citizenship of the inventor of the improved fruit-houses, where can be stored the most valuable fruits, with but little expense, and be effectually preserved until such times when remunerative prices can be realized. I have no doubt the time is not far distant when every successful fruit-grower will find it necessary to construct his own fruit-house, and there hold his surplus and bridge the glutted market. The successful experiments of the inventor should be met with all possible patronage and encouragement, and merit the praise and gratitude of all interested in the production of our fruit and vegetable gardens.

Horticulture furnishes an endless field for thought and study. Our existence depends largely on its fruits, and yet how many halt in the busy world of strife to inquire from whence come many of the luxuries, and, I might assert, much of the nourishment that sustains life? The introduction of the best productions of the vegetable kingdom is the work you are interested in. It is not my province to suggest or dictate any special means to accomplish the best results. We are here to discuss the merits of various fruits (and there are myriads of them) that have been experimented with, to endeavor to agree, if we can, by the free interchange of our observations upon such old, as well as varieties of recent introduction to public favor, that may be deemed most worthy of cultivation.

And I do not doubt we will find, as in times gone by, what flourishes and yields a rich harvest in eastern Pennsylvania will be entirely worthless in central and northern parts of the State, and *vice versa*. Hence, it becomes our duty to study well all new introductions to our favor, and plant sparingly until experience has convinced us that we will not be doomed to bitter disappointment after the expenditure of both capital and labor and years of patient nursing.

The great ambition of the people has been for something *new*, and it matters little whether it be for culinary or decorative purposes. The thought of its adaptation to the soil or climate of its future home is a secondary consideration. I might quote hundreds of instances where fabulous prices have been paid, and many hours of care and watchfulness given, to trees and plants entirely worthless.

I do not wish to be understood as being opposed to the introduction of new plants. Such is far from my thoughts. But I do wish to speak a word of caution to all, and would entreat them to experiment carefully, watch the habit and progress of the new foundling, see that the foliage is healthy, and, if a fruit, that it retains a firm hold to the branches until the fruit has ripened; that, if claimed to be hardy, it bears the excessive changes of our climate without injury, and, if a standard tree, that it has sufficient vigor to attain a size of fruitfulness before your hairs are whitened by years of hopeful anticipations to enjoy the productions of your own garden and orchard. Let not the highly-colored plates of some itinerant peddler induce you to subscribe for untried novelties without first considering the possibilities of failure and disappointment.

The growing disposition to encourage horticultural adornment is a feature that will tend to a higher advancement of civilization. The cultivation of the beautiful in nature, as well as of the necessaries of life, is considered an important element in the culture and education of mankind. What man, woman, or child, whose finer sensibilities have not been dwarfed by avarice, penury, or selfishness, but will halt and admire the well-kept garden and its beautiful surroundings, and enter a word of praise and gratitude to the Giver of all good.

Another great use in the cultivation of rural taste is to be found in the influence it exercises over the social intercourse of a neighborhood. The kindly relations and the interest manifested in each other's rural adornments have a tendency to elevate and educate the finer sensibilities of our nature and assist in diverting the mind from the baser thoughts of life.

The influence of the examples of good taste is having its good effect in all locations in the neighborhoods in which they are situated. With a few choice and carefully selected specimens of trees, plants, and vines, being careful to not crowd them too closely, the neglected yard or lawn will soon have its attractions and afford pleasures not found elsewhere.

The inauguration of Arbor Day into the public schools of our State will do more than aught else to awaken in the minds of the youth a thirst for more decorative gardening. A striking instance of this kind came under my own knowledge, where a little boy, with a trowel in his hand, was vainly endeavoring to dig a stray honeysuckle at the roadside of an adjacent nursery to plant near his mother's door as a souvenir in honor of the day. His unsuccessful efforts being observed by the genial and benevolent hostess, he was invited inside and his wants supplied with a fine large plant that would do credit to his energetic spirit and soon reward him for the time and labor bestowed.

I do not now remember to have heard who was the father to the thought, but his name should be inscribed high in the list of those whose honored fame may live to be adored by future generations. The zeal with which old and young have taken to establish a desire for more extended planting, will, in the near future, reap its reward in all districts, by better-kept grounds and more attractive homes. I trust the time will come when this country will favorably compare with those of foreign lands, so noted for the rural embellishments of their homes. We are told by those who have visited beyond the seas, not only are the parks, palaces, and public grounds models of taste and neatness, but the wayside cottages of the humble laborers have their lovely bowers and well-kept lawns, giving a charm and attractiveness not attainable by any other means.

One of the later and most popular industries in this line is the growing and disseminating of chrysanthemums, which, although not fragrant, but rather repulsive to the smell, are, at this time, attracting more attention than any other single class of plants. Their easy growth, hardiness, and various shades of color, and blooming at a time when our summer flowers are over, have, I am glad to see, awakened a new interest, and extended the time for summer and autumn enjoyments. What could be more striking at this season of the year than a well-designed ribbon bed, with its bright colors, to gladden the heart and feast the eye, just before the forthcoming mantle of snow admonishes us we must go into winter quarters.

The success and failure of our fruit crops we can all discuss, but who can bring it about under adverse circumstances? The apple yield, the season past, has been so poor and inferior as to almost dishearten the orchardist; nevertheless, some of the northern sections of this State, and the New England States, were blessed with a bountiful yield, which supplied our markets with the best colored and most perfect fruit I have ever seen, and at moderate prices to the consumer. Pears yielded well, and their quality was fine in most sections, after all the cry and alarm in regard to blight and other diseases. I believe it is easier to grow and produce a crop of the latter than any other of our seed fruits. I rejoice to see a growing desire to plant quince trees. It is now not unusual to find them planted in groups and orchards, instead of a tree or two, as in former days. There is no fruit that, to my knowledge, possesses such fine flavoring qualities, and, although not desirable except for canning and preserving, to be used alone, it is surpassed by none when used in connection with apples for sauce or jam. Of the stone fruit, I leave for the General Fruit Committee and yourselves to discuss, as well as the smaller, but no less important, products of your orchards and gardens.

At the suggestion of some of the members, and after the financial success that attended our exhibition of fruit at the State fair, in 1884, I was instrumental in having several packages forwarded to the last show; but being unable to attend in person, and not having heard that the awards, if any were made, were ever paid, I conclude that, owing to the financial distress that has overtaken them, it would be impolite to investigate; so let the matter go, and charge the expense to loss and gain.

The subject of holding an exhibition by this Association has been repeatedly spoken of, but I cannot see that it would be advisable until our treasury is replete with funds, and the loss that might occur would not leave us bankrupt.

To enlarge the usefulness of this Association is the wish of us all. We are here to devise means of attaining the greatest returns. Each member's experience and observations during the season which has passed, assists in the solution of the problems heretofore unanswered. It is by united action, and the unselfish expression of facts and opinions, that we are taught to avoid the failures, and traverse the route that leads to success. I would, therefore, suggest that we have a full, free, and concise expression from all, and I feel sure that when we have adjourned there will be no cause to regret.

It becomes my painful duty to refer to the death of one of our Vice Presidents, Mr. W. S. Bissell, of Pittsburgh, Pa. Although I had no personal acquaintance with him, his long and active association and earnest work in horticulture are well known to many of you. His genial disposition and exemplary character won him hosts of friends who deplore the loss of his fellowship, and this Association has been deprived of an honored and much-esteemed member.

I would also refer to the death of Lewis C. Lyte, of Bird-in-Hand, Pa. Mr. Lyte was No. 5 on the list to enroll his name among the pioneers of this Association, and was one of the active workers in the primitive days of the organization. As years rolled by, and the infirmities of life increased, his presence was not always found at the annual session. He was none the less zealous in the work of culture. Thus, one by one, the co-workers in the labor of love in which we are engaged are called to answer the summons of Him who rules over all.

Before closing the wandering and imperfect expression of my thoughts, I desire to tender my gratitude for your kind attention, and extend to all an invitation to take part in the discussions of the various topics brought under consideration. The experience of visitors as well as members we desire, and I assure you hearty welcome to the participation in our exercises. It is from the free and unselfish expressions of our observations and experience that enables us to extract the good from the worthless, that we may be the better able to enjoy the fruits of our own vines and fig trees.

The following essay was read by Prof. W. A. BUCKHOUT, of Pennsylvania State College, on

THE ADORNMENT OF HOME GROUNDS.

If any apology is needed for appearing before you with a subject upon which so much has already been said, and one with which, by practice as well as in theory, many of you are very familiar, it may be found in the belief, deep rooted in my mind, that there is still great need for instructing people in our State in this respect, and, moreover, that this particular time is opportune for again calling attention to it. Not since your Williamsport meeting in 1878, have the claims of this branch of your work been specially presented; and while I may not be able to bring forward anything really new, I should like to urge, more especially upon those of moderate means, the importance to themselves and to the community at large of greater attention to the adornment of our home grounds. And my reasons for thinking it worthy of consideration now are briefly told. In the first place, it is a matter of common observation and common regret that country life seems to have so few attractions for young people. And do I overstate the case when I say that the cheerlessnness and barreness of many a country home are oftentimes the reasons for this? Taste, education, circumstances, may all point to country life and country occupation as the most natural, and the most desirable, but in spite of all its advantages, this lack of pleasant, tasteful surroundings leads many to abandon it, and take their chances in new occupations whose struggle and competition they know nothing of. I do not mean to say that this is the only cause, or even the chief one, but that is often an important reason, and sometimes a deciding one, I am quite sure. The other reason why this subject deserves attention is because of its educational value. Insensibly, it may be, but the not less inevitably, are we affected by our surroundings. As the patient finds his health and his spirits varying with the changes of the weather outside of his sick-room, so are we affected by the landscape about us. Anything which attracts and engages the attention and investigation of young or old is an educator by just so much as it improves the taste and enlarges the understanding. That this is precisely the effect where pains have been taken to make attractive home grounds, there can scarcely be a doubt. We judge of the character of a community by various considerations. One is very apt to be attracted by some special feature in which he has an interest. A horticulturist notices the evidences of horticultural knowledge, and of taste displayed in the grounds, trees, and shrubbery. To him these indicate the degree of intelligence and prosperity in the neighborhood, and where marked attention is given to landscape art he notes it as indicative of superior intelligence and refinement. Other things may show more lavish expenditure of money in the gratification of love, of show, or of care, but it is doubtful whether anything more truly shows the possession of a refined taste, and a disposition to put one's self in accord with the natural world about us. And, again, what a potent factor for good is such a taste in any community!

The patron of landscape adornment works for the community more than does any one else. He, indeed, is the possessor, but every passer-by gets a benefit from his possession. The undulating lawn, the trees and shrubbery are legally his, but he can hardly shut out from the eyes of his neighbors, who share with him the work of his hands, the evidences of his taste and means. Indeed, he has little desire to do so, even were he able, for it is one of the happy results of a love of natural things that it eradicates selfishness, and makes one more thoughtful for the needs of others. Our public parks are justly valued for the innocent recreation, and for the means of out-door education which they afford to the people at large. In much the same way, every well-planned and well-kept country place, whether large or small, is a veritable educator to all about it, and a most effective stimulus to a better life. May we have many such among our farmers, and may they be centers from which shall proceed a heartier love for nature and a stronger desire on the part of all to make life more worth the living.

I need not detain you by enlarging upon these two points, which I am sure no one is disposed to deny. Let me rather strive to show some particulars in which these ends can be, at least in part, secured. The task, I apprehend, is not an easy one. I must needs run counter to the idea, deep-rooted in the minds of many, that much time, much money, and a great deal of what we sometimes call by the suggestive name of "bother" are required. That some work or trouble are required is undoubtedly true, but allow me to say that I have yet to see anything in this world worth the having which does not require work or trouble; the question is not to avoid work, but to reduce it in this case, as in every other, to the lowest terms. This done, and we have done all which, in the nature of things, we can be expected to do. Foresight, planning, and careful attention to details are necessary to secure this end. Mistakes and losses are to be expected. It is not in the nature of things to avoid them completely; care will reduce them, but cannot wholly prevent them.

To begin at the foundation, the location of one's house has very much to do with what is possible to make of its ornamental grounds. I know that in nine cases out of ten the house is already fixed, that it stands—where it stands, and that it is idle to speak of any change, but it may be that I speak to some one whose house is not yet a fact, and so being, allow me to ask, is there any good reason why a house should be a quarter of a mile or thereabout back from a public road? Back so far that the inmates can neither see out nor get out with ease, and the passer-by is equally at a loss to see in or get in. With a long and narrow lane, which must need be fenced on both sides, taking up much land, costing much to keep in repair, marking the entrance. Wherein lies the advantage? Or, on the other hand, what induces a man to drive his stakes so near the public highway, that standing on his doorstep he can almost touch the passing vehicle with his hand?

With no privacy for his family, bothered by every tramp and peddler, his house mistaken for a toll-gate, it would seem that life must have much of petty annoyance for the dwellers in such a place. Extremes meet, and we need not go a thousand miles from home to find just such examples as these; and, not alone in old houses, which were built under quite different conditions from those which appertain at present, and whose owners are thus excusable, but even in houses which have been built but recently, and still have an air of newness about them.

Now, whatever may have been, or still are, the reasons for this state of things, it behooves him who sets out to build to consider carefully, to look at the matter from every possible stand-point of present and of future need, and to be in no haste to decide what is one of the most import matters in a lifetime. This may seem to be making a good deal of trouble over a very easy thing, but, as the location of the house is at the bottom of all which can be done for its effective ornament, and as it is the center towards which every outside adornment converges, too much and too careful attention cannot be given to its judicious location.

Moreover, a mistake once made in this respect is either impossible to correct, or can be done only at considerable difficulty and expense. Hence, the experience of others should rather be courted and desired than avoided. It is a common remark that a man ought to build and live in two different houses before making a permanent one for himself; and, while this is generally said with reference to the internal arrangement of a dwelling only, it applies equally well to its position and surroundings.

Where it is possible to do so, the ground should slope slightly downward from the house in every direction. This is so manifest an advantage, and, in some cases, so much of a necessity, that, even on the score of drainage, it is often done at the cost of a good deal of labor; but I speak of it now solely from an ornamental point of view. It allows of a more natural, simple, and pleasing arrangement of walks and shrubbery, and, moreover, one more easy of maintenance in good condition. I say slightly sloping downward, by this meaning a fall of not more than one or two feet in a hundred, if the ground will permit. This implies that all grounds in the immediate vicinity of a house ought to be carefully and accurately graded. It is worth all the trouble and time it takes, because of the ease and satisfaction with which each later step is taken. Indeed, without a well graded surface on which to work, so much difficulty is likely to be encountered that it is no wonder one loses heart, and feels poorly rewarded for his labor and pains. Like adding new cloth to an old garment, or putting a fine picture in an old frame, is the attempt to beautify grounds which are left rough, stony, and irregular. Let the grading be done carefully, even if it must be done piecemeal and at odd times. And in grading, do not forget one thing very frequently neglected or forgotten, namely: see to it that the good top earth is not thrown to the bottom of a filling, and the surface made up of the poorest, thinnest, and stoniest of soil which has come from the bottom of your digging. In some way manage to reverse this arrangement, so that the surface everywhere shall be covered by a soil which shall properly nourish and support whatever you may see fit to plant in it, and that at once, with no vexatious delay. This can only be accomplished by retaining the surface earth of your excavation for a covering, or securing good soil from some other place.

Granting that so far has been well done, there are now some quite serious questions to be decided, and some regarding which, I presume, there will be very great differences of opinion. There must of necessity be some kind of road or walk, or both, giving access to the house. Where shall they be? how many? how made? these are questions which press upon us for solution. And when there are no definite or set conditions in view, I need mention only some general principles, concerning which there is pretty general agreement on the part of landscape gardners. *First*, as to their number and size, they should always be as few and as small as will meet the actual necessities of the particular case. There are two reasons for this: *First*, because they are expensive to make when made carefully, and, *second*, because, with the best of making, they need constant watching and frequent repairs. Very often both foot-walk and road-way can be combined at least for a certain distance, and answer a double purpose. A greater number of roads and walks than is really needed may be ever so advantageously placed or well made, and yet may be exceedingly unsightly, giving an air of attempt at effect, or of patchwork, sometimes so marked as to appear decidedly ludicrous. In the composition and making of a good roadbed there is probably more difficulty and labor than in any other one thing. The expensive roads of public parks and grounds seem quite out of the question for private places, unless very short roadways are needed, or such as are to sustain a good deal of travel, and more suitable material for road surfaces is not easily obtained. Limestone valleys (such as ours) seldom contain, in sufficient quantity, such gravels as will pack readily, and the broken slate which wears and wastes away rapidly is only an imperfect substitute. For foot-walks there is, all things considered, nothing better than our anthracite coal ashes, which, if laid over a bed of broken stone, makes a walk reasonably hard, quick to dry, and easy to walk upon. Exception should be made in case of much-traveled short foot ways in close proximity to a house. These are much neater and more satisfactory in every respect if laid at once with flagging stone or boards. On inclined surfaces the washing of roads and paths is often a serious annoyance, and one not easily remedied.

That monument of the road-makers' industry, well-named with us the "breaker," may be a necessity in some cases, but if so, give it as little prominence as possible, and abolish it entirely where side gutters with occasional channels leading to adjoining lower ground will answer the same purpose. How unsightly it is to see a roadway grown up to weeds and grass, except along the beaten tracks made by wheels or horses' hoofs. To remedy this, calls for an occasional weeding of roads as of a garden, and herein is made still more evident the advantage of well-prepared roadways suitably graded: weeds find a difficulty in getting a foothold in them and are easily discouraged or removed. The direction of roads and paths calls for attention at the outset. To make the least distance from point to point, the line should of course be perfectly straight, and show no deviation on any account. This is sometimes best, but not always. Curved lines are always more graceful than straight ones, and admit of a more pleasing arrangement of shrubbery, but let the curves be gentle, and for some good reason either real or apparent. Better the straightest of lines than a series of snake-like windings for no reason whatever, and which appear the more ridiculous the longer one looks at them or the oftener they are traveled. In every case, the aim should be to make a natural, easy approach, considering the lay of the ground and the obstacles in the way. If a straight way accomplishes this best, it should be straight; if a curved way, it should be curved. In many, perhaps most cases, the latter will be found to be the case. Any set or formal figure, whether bounded by straight lines or curved, which roadway lay down about a house, should be avoided. Perfect circles or ellipses, while not as objectionable as rectangular figures, are not as pleasing as irregular designs, particularly where there is a lack of trees and shrubbery, so that the perfect regularity of the plan is at once caught by the eye. The great bulk of one's ornamental grounds should be in sod and permanently so. If the ground has been graded with care, and the roads and walks laid down where they are to remain, the seeding to grass should be done at once, and a heavy sod maintained as good soil and an occasional top-dressing of manure can make. Not that I would advise no trees, no flowers, and the like, but that I would regard them as after-thoughts, and first make provision for the grounds as a whole. Moreover, if the grading has been well attended to, the cutting of grass several times in the course of the season can be attended to at the least cost of time and labor. I know how a farmer's necessary work pushes and presses upon him during the early summer, and this is one of the reasons why special care and pains should be taken to get ornamental grounds in such smooth, compact, and accessible form, not cut up by useless roadways, fences, or scattered trees, that the cutting of the grass can be easily and rapidly done.

For quite small grounds, a hand lawn-mower is the best for the purpose, and for larger grounds the hand lawn-mower; but for all practical purposes the farmer's ordinary mowing machine, if kept in good condition, will answer very well. The reason why it is not more frequently used is not so much the lack of time, but because of the rough, stony, and irregular condition of our yards; farmers often tolerate a large unsightly patch of ground about the house, of which they would be heartily ashamed were it in any of their cultivated fields. The keeping of grass short is not so important as some other things, but a house always looks and shows off better when this is done, and it is a great convenience, especially in the immediate vicinity of the house, not to be obliged to have to walk in thin, wet, or tangled grass whenever one steps off the beaten paths. If it were a choice between a fine sod a few square rods in extent or a flower-bed, I think I should prefer the sod, as being more easily obtained, more easily kept in good condition, lasting longer through the season, and being, all things considered, more pleasing to the eye. The commonness and apparent simplicity of our humble and useful friends, the grasses, lead us to think lightly of them, if at all, as plants of ornament. It needs but little thought to show that they are as valuable among ornamental plants as they are among plants of use. They fill a niche in the ornamental world as they do in the useful. Suppose for a moment that we had no grasses. We should have no sod, at least nothing anywhere near equal to our grass-sod, for we have no other plant that can grow in such a dense mass as they, and so effectually combine to cover and occupy the surface, and thus exclude other things. No matter, then, with what care we leveled and smooth our grounds, we should have them covered with a heterogeneous mixture of plants of all sizes and characters struggling for existence, and between them we should fail of anything combining the softness, compactness, and springiness of our common well-grown grass-sod. As to planting trees and shrubs on our home grounds, there is much to say. I take it for granted that they are to be planted, and there are many questions of detail that need to be decided before the work is begun. *First.* Do not attempt to put trees in formal rows or lines at a set distance apart — a commendable practice that may be as a border to the highway, or on a road which is unusually long, so as to be as much the same nature of a public road, but rather seek to put them somewhat in regularity over the grounds, and yet with due reference to several points which call for a good deal of foresight on the part of the planter. One must look ahead and see what changes the next year, and the next, and so on are to make in his trees, and be governed accordingly. How large are the trees likely to grow? How long will it be before they reach such a size? What is their habit of growth? Are they evergreen or deciduous? Is it late in the spring before the new leaves appear? Are they subject to insect injury in this locality? These are some of the questions which the planter ought to know beforehand. Besides this, comes in their relation to the house on the one hand, and the drives and walks on the other. No one wants, or should want, his house so shut in by trees either in winter or summer as to prevent a free outlook, at least along certain lines, and in certain directions. One might as well live in a prison, with a prison wall staring him in the face, as to live in a house surrounded by a forest of trees. Very commonly, however, about new premises the difficulty is just the reverse; growth is so slow that to plant as one would like to have permanently, does not give sufficient shade and protection until the patience is well nigh exhausted. To strike the golden mean between these two extremes is a puzzling question. All things considered, the best solution, it seems to me, is in planting quite close with the intention of removing or cutting out afterwards. I know the difficulty—what is often the result. It is that after the desired effect has been produced, and the time to begin thinning out comes, one's courage fails, and he says: "These friends which I have tended in their infancy and their youth, which I have watched over through storm and sunshine, I cannot destroy them now; I will wait a little longer; they are not crowding much; they will soon shut their leaves, and I will wait until spring." And so he hesitates from year to year until something must be done, then, he finds, after removing those not needed, that the remainder is sadly misshaped, one-sided perhaps from long crowding, and the whole appearance greatly marred, perhaps permanently so. But, on the other hand, by comparative close planting, a good effect can be more quickly produced, and the bare and dispiriting look of a few struggling trees, making but slight progress each year, is avoided, and I see no reason why one should not thin out trees on just the same principle as he thins out onions or corn.

That which is seen in the crowding of trees by one another is equally manifest where there is too close planting along roadways and walks, and in the shadow of the dwelling-house. When young trees are planted, it is no unusual thing to see them placed so near the lines of travel, that in a very few years their branches extend over and obstruct the way, while cutting away the branches may remove the difficulty that may not be a desirable thing to do. An evergreen tree, for instance, loses half its beauty if the lower branches must be trimmed away to make room for the road underneath it. Planting close to the house is the same kind of a mistake, and should never be done unless with the express intention of cutting out the trees, or removing them to some other part of the grounds, after they have served their temporary purpose in the first place.

A tree permanently placed should have room enough to spread its branches naturally and display itself to the best advantage throughout, and whatever its situation and surroundings, this should not be denied it. Attempts at improving upon nature in this respect are very apt to be anything else but improvements. We often see single trees trimmed, and sometimes sheared into stiff, set forms, but they are mere curiosities, showing what a tree can be made to endure, and ordinarily not worthy of being copied. Particularly objectionable is this process as applied to evergreen trees, and when all the evergreen trees are treated in this way, the effect becomes positively hideous, reminding one most forcibly of those once common German boys whose pine trees, whittled from pine wood, were arranged in regular rows like trees in an orchard in the stiffest and straightest manner, while with equal rigidity wonderfully straight wooden soldiers were set up near by, the whole colored vivid green, and supposed to our childish eyes to be inexpressibly grand. Give evergreens a good place and a good chance, and they will take a natural, graceful form, far superior to anything which art can produce.

The landscape gardener, whose work is for public grounds and individuals of wealth, lays down, it is true, some quite arbitrary rules on many matters connected with tree-planting; but for the most part his ideas are worthy of careful attention and literal following. Much experience in one line of work under different conditions ought to give him authority to speak, and on the matter of a liberal distance between trees, and allowing trees to take the form peculiar to each species, there is practically but one opinion. All things considered, the best method of arranging ornamental trees is to put them in no regular fashion, but in groups or clumps, preserving as much distance between the individual trees as the nature of the trees demands, and making the groups in turn correspond to the house and the lay of the land. This should leave more or less of open lawn space directly in front of the house or at the sides, as the case may be, and this is always necessary to furnish place for out-door games or children's play-grounds, besides leaving the view unobstructed along certain lines, a point which should never be forgotten. The arrangement in groups has a further advantage in that it makes the cutting of grass much easier, the spaces between the trees needing but little attention, except for the first few years; after that time, the natural growth of the trees keeps down the grass around and between them. Meanwhile, the spaces between the groups are large enough to admit of cutting by machine.

As to the composition of these clumps of trees, and the particular kinds to plant, so much is dependent upon circumstances that I should prefer not to mention varieties, were it possible to avoid doing so.

First, however, there are some general principles, to which attention may be called.

If a person is willing to spend considerable money, he may choose from a nurseryman's list a generous variety, but even then to avoid disappointment, it is well to get some advice, if possible, as to the hardiness, rapidity of growth, and other qualities of those kinds not common to his own locality. As a general rule, native species are much better than foreign, but there are some marked exceptions to this rule. New things, no matter how highly praised, should not be touched at all, unless the mind is made up to begin with that it is a risk, and it is recognized as such. But the average man, who has but little, if anything, to spare on ornamental grounds, must needs take of our common native varieties, such as he can easily get by himself or through friends, and there are no finer trees anywhere than our own elms, ashes, maples, &c., which can often be had for the taking up alone. A mingling of evergreen and deciduous trees ordinarily gives a pleasing effect, and has an added advantage in that it makes a brighter picture in winter than if made up of deciduous trees alone. If the group is small, comprising not more than four or five individuals, the tallest and largest trees appear rather better if in the center, and the slower growing ones on the margins of the group. If a greater number are used, let the larger trees mark two or more points in the group, and about each of them as a center space the smaller kinds. This, and many other points in grouping, has much value in large grounds, and becomes of less and less importance, or less and less practicable in smaller places, other considerations taking the place of those mentioned. Shrubs have equal value with trees, particularly so in small or confined places, and the same general principles apply to them and their management as to trees. More commonly they are valued for their flowers rather than their beauty of form or foliage, and in some cases special regard should be had to the habit of suckering, which is often quite annoying. Pruning thus becomes more of a necessity with them, and, considering their differences in habit, mode of flowering, and the like, there is opportunity for a good deal of difference in that process. To fully appreciate this, one need to take the knife in hand himself, and to note the result of his work.

There are many situations, not only in contact with the buildings, but outside of them, where vines or climbers of some kind are the most desirable things to have. Such situations may be quickly filled, for there is no lack of material for them. Distinction should be made primarily between a climbing and twining vine. The former gains foothold, and grows upward by means of tendrils, rootlets, or other sensitive bodies by which it grasps objects convenient for its support; the latter twists growing stems about such objects, but since this twining or twisting can be done only about objects of a limited size or diameter, twiners must have a specially prepared trellis or the branches of trees about which to grow

And, for that matter, the climbers differ so much in the nature of their clasping organs that this should be taken account of in giving them a place, otherwise a vine may prove very unsatisfactory, entirely failing to cover a given surface, which it has been desired to hide, or being broken away by the wind as fast as it gets its growth. Often we may see a wall or trellis on which a vine is held by artificial supports, strips of leather being most generally used, and each growing stem must be followed up as fast as it grows, thus entailing a good deal of labor, and unnecessary labor in almost every instance. If it is a bare stone or brick wall that is to be covered, we have vines equal to the task, whose rootlets, countless in number, can take advantage of the slightest roughness or inequality in mortar or brick; or if a trellis is to be covered, we have climbers or twiners whose tendrils or stems only need a little help at first, or an occasional touch or bend to send them just where and as they are wanted. Whether for flowers, for shade, or for foliage effect, there is always something well able to meet the needs of the case. There is no pleasanter spot in summer than an old-fashioned vine-covered arbor. The grape is often used for such a place, thus combining the useful with the ornamental, but many other vines can be used to very good advantages, and it is a pity that the vine-covered arbor is not more frequently seen. In the case of all vines, but especially of twiners, it should be remembered that when the soil and exposure are good and congenial, the vine will acquire a large size. If twining about a tree, the vine will sometimes strangle it, actually choking it to death, or causing the top, or large branches, to be so weakened that they are broken off by the wind, or if growing upon a veranda or porch trellis, may twist the trellis out of shape or pry apart the slats. Even quite large pieces are sometimes crushed or pushed out of place. While the remedy for this difficulty is obviously to cut away the vine, it is well to use sufficient forethought to prevent finding it necessary to destroy even a vine after time and trouble have been used to rear it. A novice almost always has an idea that he wants a hedge on his grounds, or if not one, more likely two than none at all. He has heard a good deal of hedges, how handsome they are; perhaps has seen fine examples of them in public grounds or nurseryman's show places. A hedge is a very good thing indeed in its place, but its place is well-defined and limited. A hedge is a fence, or screen, of living shrubs; the fact that it is alive does not prevent its being a fence, and since it is a fence, it must needs be for the purposes of a fence or screen; that is, to keep something which is within from getting out, or to obstruct the line of view, or something without from getting in.

Whenever a hedge is used, it should be with this idea plainly in view. There are many such situations, but there are other considerations which make the use of hedges a matter of more than the usual difficulty, and the places where they should be planted on a farmer's grounds are comparatively few. The difficulties in the case are precisely those before mentioned in the case of trees and shrubs, only that they are intensified ten fold. In order that the hedge may be an effectual barrier, it is necessary that the plants be set close together, so that their branches may be naturally interwoven, the more the better; the larger the hedge becomes, the more crowded the branches. This crowding produces unequal growth, and a smothering of the under branches by those above them. Gradually the hedge becomes thin and straggling below, thick and bushy at the top and sides. Trimming, judiciously done, will, in part, remedy this or delay it, and some shrubs are so vigorous that they will stand considerable neglect and look fairly well for a number of years. Again, a hedge to do well needs to have, not only soil room to itself, but also light and air room; that is, it should not run under trees or too near buildings, otherwise it will be robbed of light and air, as well as food, and such shaded parts will soon become very thin and poor compared with the other portions. The trimming of a hedge should be regularly and carefully done at least twice a year, and oftener, if there appears to be need for it. The best form to trim to is the conical, since it gives special advantage to the lower branches, which need to be constantly favored. The beauty of a hedge, like that of an evergreen tree, is in the conical form, starting with the ground and tapering upward to the top. Other forms are often used, but none are so pleasing as this, nor so favorable to symmetrical growth.

Having considered some points which have general application in determining the choice of ornamental plants and their treatment, many will want to know something more of the special varieties that are considered best. Besides our common kinds, which should be used wherever they seem to fit well, we have many smaller or less familiar species which are valuable. Of this class among trees are our smaller maples, the mountain maple and the striped, some of our haws, and dog-woods. Then, too, there are many, both large and small, that, while not growing naturally with us, are common west or east of the mountains, and do as well with us as in their native homes. Among such are the red-bud, Buckeye, Kentucky, Coffee-tree, Yellow-wood, and the Catalpa. Many species which grow naturally in swamps and boggy situations are generally thought to be ill-adapted to dry cultivated soil. Experience has shown that this is frequently a mistake, the trees growing in such wet situations naturally simply because other species have preëmpted the dry places, and the bog dwellers are unable to dispossess them.

Such are the black-ash, bald-cypress, and laurel-magnolia, the last two, perhaps, scarcely hardy here. Of foreign trees some have been so long and so favorably known that they deserve special mention. For instance, the Norway spruce, which grows satisfactorily almost everywhere and needs very little attention. Despite its extreme commonness, its admirable qualities make it worthy of frequent planting; also, the European larch, which is much finer than ours, and excels it in every particular when they are growing side by side.

Of late years many of the finest trees for the Eastern United States have come to us from Japan. It appears singular that from so remote a part of the world should come anything of value for our climate and conditions, but such is the case. Indeed, as between Japanese species and California, there is no doubt but that the former are much better adapted to our climate than the latter. This is in accord with a now well-known scientific fact, namely: that the flora of Eastern Asia is much more nearly allied to the flora of Eastern America than the flora of Western America is. A tree called the ginkgo tree, or *Salisburia*, from Japan, is now quite commonly seen, and has rare and peculiar interest to any one who cares for the associations connected with trees. It is a tree growing some eighty feet high when in its prime, of a pyramidal form, bearing leaves of a singular fan-like outline, somewhat two-lobed, and having diverging and forking veins, something possessed by no other tree, but a common and characteristic arrangement in ferns. It is a coniferous tree, though it does not bear a corn. Some quite large, perhaps half-grown specimens, may be seen in the eastern part of our State, and in Central park, New York, where it has fruited several times. A further matter of interest connected with it is that it is probably the oldest species of tree that is now living upon the earth. It is found in fossil condition away back in the coal-forming age, and has survived all the changes which the earth has gone through until the present time. It still seems a vigorous species, and its record in this country is of a perfectly hardy tree of moderate growth, and well adapted to general cultivation. A ginkgo tree is well worth having on many accounts.

Shrubs are often supposed to include a white and red lilac, a snowball, and a few roses. These are very good, but we need not stop with them. The *Forsythias*, *Weigelas*, and *Deutzias* are shrubs of the simplest, and easiest growth and management, and will attract attention anywhere by the profuseness and beauty of their flowers. The first-named shows its yellow bells as soon as spring opens, while flowers are still a variety, while the others are somewhat later. All can be raised by ordinary cuttings, and the *Forsythias*, particularly, are about as hard to make grow as a willow twig or a horse-radish crown.

If any friend can give you slips, you can raise the plants yourself. Of shrubs more woody and tree-like, the golden arbor-vitæ, the retinispora, and the holly barberry may serve as examples. These are all evergreen, and in the course of the season change very much in color, the golden arbor-vitæ being a light, yellowish green while it is young, but changing to quite dark red or brown during winter. The holly barberry, though a Pacific coast shrub, is perfectly hardy, and though slow growing, very sure. Its leaves are an excellent imitation of true holly, and vary from green to a clear red. It ought to be used more than it is.

For vines, we have many excellent things. Beginning the season, a beautiful finger-leaved variety, the Akebia, for which we have no good common name, shoots out very early, long before many of our native things have thought of venturing out. Its flowers are not conspicuous, but its delicate twining stems, with their five-fingered leaves, are very handsome. A wire or light wood trellis is easily filled by a solid mass of foliage, from the ground up to a height of eight or ten feet. The two honey-suckles, Japanese and Chinese, are first-class vines, start early, flower young and often through the whole season, and grow vigorously besides. Clematises are also very satisfactory. Our own Virginian clematis is an excellent vine, though it should have a good deal of room. It is apt to be a rank grower, and to crowd adjoining plants. A more delicate vine of much the same type is the yellow-flowering clematis graveoleis. Not only are the flowers of these plants handsome, but the fruits are exceedingly ornamental, holding on until winter comes. The larger flowered clematises are now getting quite cheap, and they are probably the most showy flowered vines which we have. Any one who has a dollar to spend for out-door plants, and has a favorable place, can get more satisfaction out of his money from clematises than from ordinary bedding plants, which last only a single season. The figures shown in dealers' catalogues are not exaggerations. I have seen plants fully as fine as any of these pictures. They are among those things that can hardly be exaggerated.

For bare walls, we have our own woodbine or Virginia creeper, and the trumpet creeper, excellent, strong-growing vines, which are handsome either in leaf, flower, or fruit. Probably you can recall houses and trees beautifully covered and draped by them. The Japanese creeper, or woodbine, is much like our own, but clings more closely. Smooth indeed must be the wall and strong the wind that can avail the tallest city houses, and high up on the walls of large buildings to keep it from creeping upward. Though of comparatively recent introduction into this country, this elegant plant can now be seen in very great abundance in many of our cities. It rises to the tops of buildings with greatest ease.

Of hedge plants, there is also quite a variety from which to choose. Shall the hedge be evergreen or deciduous? Shall it be a spine-bearing species or a smooth-stemmed? The evergreen are the prettiest, and a well-filled hedge of arbor vitæ, or of hemlock spruce, is always a neat and handsome object. They are better adapted for screens than anything else, but are scarcely able to serve as fences without some protection. Of the smooth-stemmed kinds, there is probably nothing better than the old-fashioned privet or the elæagnus of the West, the latter not so commonly seen. With the spring-branched kinds, considerable difficulty is experienced in keeping them within bounds and well filled out. The most tractable of them all is, perhaps, the osage orange, and, if one has use for a hedge of this kind, I doubt whether he can find anything more satisfactory than this. It seems, by the way, to be not generally known that the osage orange is a tree, and an American tree. Though seldom seen in tree form, it makes an exceedingly unique ornamental specimen. It grows rather low and round-headed, and, when filled with fruits, which are remarkably orange-like in nearly every feature, it is very suggestive of a genuine orange tree. Moreover, it grows so readily from the seed that the wonder is that we do not see it more frequently.

I have said nothing of flowers, although they are generally considered to be the chief ornamental features of our yards. Proportionally, flowers take more of time, labor, and money than trees or shrubs. Still, it is largely a matter of taste whether flowers are cultivated or not. Distinction should be made between hardy, perennial flowers, and tender annuals. The former need the least care, and, when well established, will last a long time in good condition; the latter need renewing each season either by seeds or the plants themselves previously raised and bought. They should grow rapidly in order to make a show, and are gone with the first frost. It is this short-lived character which makes bedding plants expensive and often unsatisfactory; yet the superior beauty and profusion of their flowers make them always attractive and fascinating. Flowers should be placed near to the house or bordering walks, or along any set lines upon the grounds. By no means put flower beds in the middle of a lawn, where they give the appearance of having been put in for effect, or at any place where they do not seem to harmonize with their surroundings. If the flowers do not do well, the beds are a marked eye-sore, because of their prominent position, and, if they do ever so well, the effect is not as pleasing as if they occupied some less conspicuous place. To produce a good effect with bedding plants requires a well-enriched soil and close setting of plants. Failure to appreciate the value of these points is the chief cause for poor success.

It may run contrary to the thought of some, and yet I am quite certain it will be found true that bedding plants are less satisfactory in the long run than woody plants, show neglect quicker and more plainly; especially with flowers should one be carerul, and not overestimate his working ability or indulge much in novelties. Perennial plants need occasional taking up, dividing, and resetting, not only on account of their tendency to spread, and thus become true weeds, plants out of place, but because experience has plainly shown that such plants do very much better for the changed surroundings brought about by resetting—the soil being good, thus keeping out weeds as well as giving a more showy effect during flowering. Unless absolutely handy, a very little covering, such as a few evergreen boughs or or rather coarse brush, should be thrown over them in the fall. A very little will answer excellent. Many things are smothered every winter by being covered too deeply.

The ornamental grounds should be quite distinct from the fruit and vegetable garden. That fruit trees should encroach to some extent is a matter of but little account, but small fruits and vegetables should be confined rigidly in their own proper place back of, or at least apart from, the ornamental portion. Again, no animal should be allowed to pasture in a well-kept yard, no matter whether they are so small as to appear of no injury, not if they are tethered. If labor and pains have been taken to get everything in good condition, it is altogether out of the question to run the risk of having even our weakest and youngest domestic animals where they can do so much injury if they are so disposed. In half the cases, they will be so disposed before they have been there twenty-four hours. The only safety is in keeping them out. Certainly land is not so valuable to the ordinary farmer that he must needs crowd his garden into the front yard, or keep his stock where they are greatly in the way as well as in a position to injure growing trees. A little forethought in this respect will save much loss in ornamental grounds and orchards.

Every one who is interested in ornamental planting, and who undertakes it, should have a small plot of ground in connection with his garden, where he can plant seeds, cuttings, and the like, and thus make more or less of material for himself and friends. It looks like a slow process, but many things can be obtained to much the best advantage in this way, and it is often desirable to test things for a year or two before giving them a permanent place. When traveling, or on visits to friends, seeds or cuttings can be obtained. These planted and cared for in such a plot will soon show whether they are worth planting or not. Many things when small can be had from nurserymen quite cheaply, which would cost a good deal when they have reached the ordinary size for transplanting.

The removing to and from the experimental plot is a very great advantage, since the percentage of loss is very much reduced in the case of trees several times transplanted, and such trees always command a higher price. It is often thought that tree seedlings are difficult to raise, and that cuttings of shade trees do not root readily. This is, in part, true. That is, there are some seeds not easy to handle, and some trees cannot be raised from cuttings. But no one need be discouraged on that account. There are means of propagation fitted for each case. As a general rule, all seeds of forest trees should be planted as soon as they are ripe. They lose vitality if they are allowed to become dry. Hence, it is best to plant them as soon as they can be gathered. Such as have hard shells, as walnuts, hickory nuts, &c., should be allowed to lie over winter where they will freeze. This breaks the shell, and the germ can find an outlet. The seedling trees often need a little shading or protection from hot sun until they are a year or two old. There are various ways of doing this. Nurserymen use a layer of corn stalks or slatted frames for this purpose. For most things which a farmer would care to raise, a little brush thrown loosely over the ground, and occasionally taken up and replaced, will answer the purpose well enough. As to the use of cuttings, there are frequent cases of trees which refuse to root from them, and a knowledge of the rooting propensity in a tree should be found out before hand when it is possible to do so.

Indeed, at almost every step, the novice will find it time and trouble saved to get the experience and knowledge of some one who has been over the matter before him. So many opportunities of one kind and another are open to the learner in this work that no one need be left to grope along by himself, or work out for himself the problems which have been solved by others before him. And, if all I have said on this subject could be condensed and restated, it would be—to work slowly, after a definite plan, and with advice as carefully obtained as possible from those who have had the most experience. This done, mistakes, while not entirely avoided, will be reduced to the lowest terms. And after all the mistakes which one makes in work of this kind, unless they occur too frequently, are among the best means of gaining knowledge, leading him to become a close observer, improving both taste and judgment, and adding to his knowledge of both fact and principles. It is in these respects that attention to ornamental grounds and their planting becomes a veritable education, not inferior to that which is gained from books, and a healthful stimulus in our daily life. Let no one hold back then from fear of failure. Let no one do nothing because he cannot do all. Rather let each one do what he can. Strive to do something, if it is no more than to plant a few trees which may be called common, or train a few vines about his porch or doorway. From such small beginnings, has come the taste which has given us many pleasant and attractive country homes, where the neatness and harmony outside of the house are second only to that which may be found within; and let us hope that from just such efforts as these are to come in the future an increased attention to landscape adornment which shall make our rural life more enticing to the young, more satisfying to us all.

President **Cooper**. This is a very able and exhaustive essay, and its further discussion is now in order.

Mr. **Hoopes**. The essayist has gone over the ground so thoroughly that scarcely anything remains to be said. He has also given the subject of entomology attention for years, and we ought to draw from him all possible information on that subject during his presence with us.

Mr. S. B. **Parsons**. One of the points so ably presented by the essayist is the great want of intelligent direction and judgment in the decoration of grounds, and the mistaken idea that such adornments are necessarily expensive. The fact is there can be no better investment than the horticultural adornment of our homes. They will bring twenty-five per cent. more if arranged with ordinary taste and planted with ornamental trees. Nor is it necessary to plant ornamental trees. We can make a beautiful place with fruit trees alone. They should not be planted too close to the buildings, but leave ample room for light and free circulation of air. The taller growing trees, such as cherries and pears, should be planted in the distance, with smaller growing varieties of fruits as we approach the buildings.

Mr. **Comfort**. Many houses that seem bare and otherwise unattractive can be much improved by a few climbing vines. We can beautify our homes in this way cheaper than by any other means. *Ampelopsis veitchii* is a very desirable vine for this purpose.

Mr. **Harrison**. *Wisteria chinensis*, or Glycene, is also a very beautiful climber. I have trained one into my sitting and bed-rooms, and its foliage and bloom remind me of perpetual spring.

While in England I was much impressed with the great attention given to such matters there. Even the poorer classes give them more attention than here, and I would often stop and admire and encourage them, and show them that their efforts were appreciated. If they had sunshine in England as we have here, it would be a paradise. Wild flowers are also very abundant. In the town of Surry, they have a small society at which four hundred and thirty-two exhibits were made, mostly by the poorer classes. In London, they have one society in which no one can compete for a prize except from the poorer class. Some railways in France offer premiums to their station keepers for the best-kept lawns or flower plots, and our Pennsylvania railroad is also beginning to set an example in that way.

The prizes are not large, but sufficently so to induce friendly rivalry in this direction. In England, they also have special exhibitions of fruits and flowers. In London, they have fourteen chrysanthemum shows. In Lancashire, their gooseberry shows are very interesting and attractive. They have some twenty or thirty varieties, such as Crown Bob, Roaring Lion, and Whitesmith, some of which are as large as our plums. We must bear in mind that the average pay of laborers there is but two shillings, and that only about two hundred thousand out of a population of twenty-five millions own their homes.

Col. McFarland. If we should not plant large trees nearer than one hundred feet from our dwellings, most of us, I suppose, would be obliged to plant outside of our yards. Many of us would have but a limited supply of fruit if this idea were carried out. I would like to hear Mr. Parsons' views.

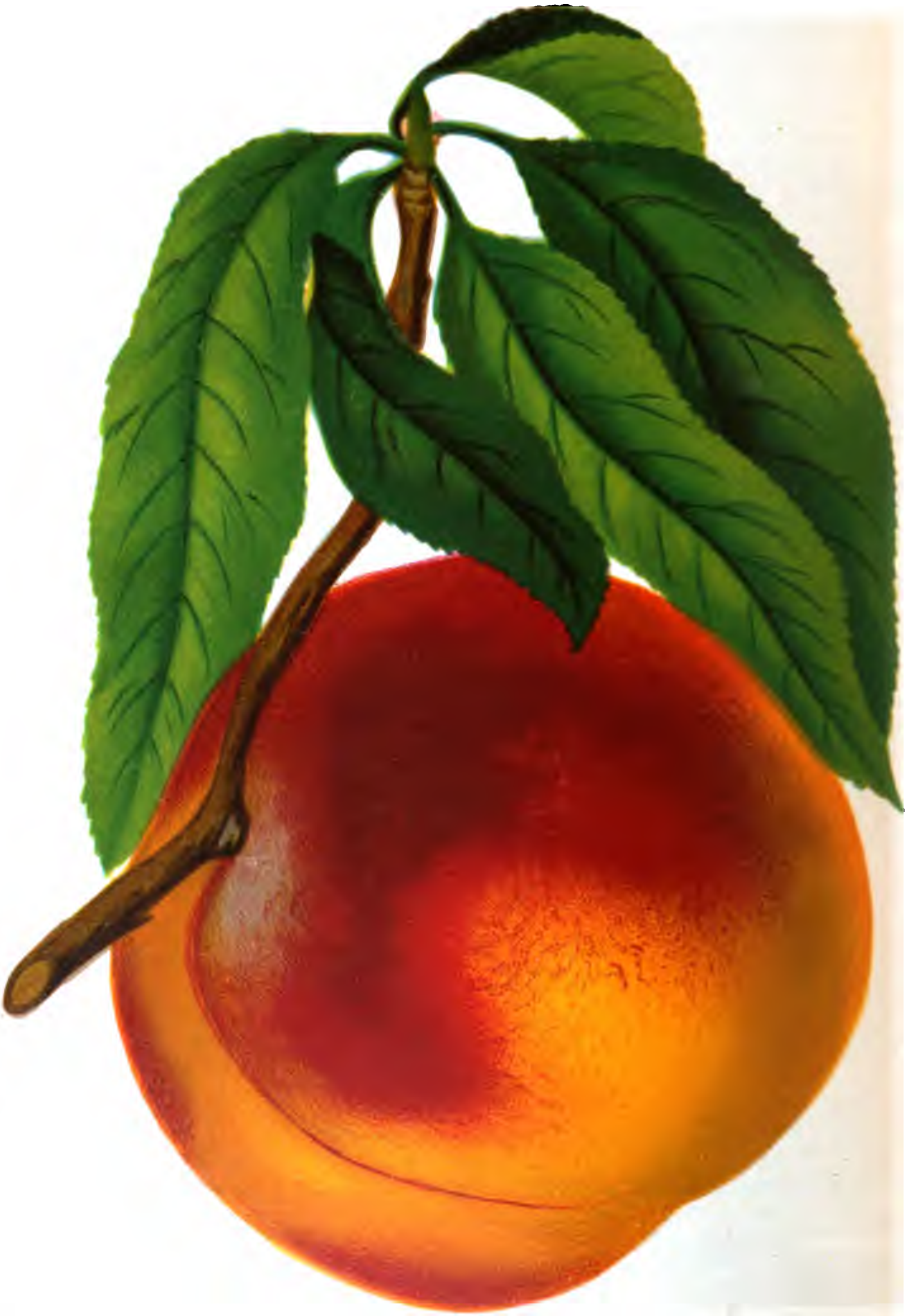
Mr. Parsons. Of course, I was speaking of farmers' homes. If we have a farm, we should have two hundred feet of yard. Teach farmers to put their buildings back. They can then have the advantage of a clean stretch of turf around the house, with plenty of light and free circulation of air. Evergreens should be planted on the north side, and, if one hundred feet from the building, will protect it from the winds. Would plant no trees that, when grown, would be nearer than fifty feet from the house. I planted ten or a dozen oaks thirty-five years ago, eighty feet apart, and the branches are just beginning to meet. Central park, in New York, shows the effect of close planting. The trees need thinning out, and it is difficult to know what the effect will be. Considering all the advantages, I would rather plant as trees should be thirty or forty years hence. In this way we can best develop their beauty.

Mr. Fox, chairman, submitted the following

REPORT OF GENERAL FRUIT COMMITTEE.

To the Officers and Members of the State Horticultural Association of Pennsylvania:

Gentlemen: The undersigned chairman of the General Fruit Committee would respectfully report that, for the purpose of obtaining information in regard to the horticultural and pomological results of 1885, a circular was prepared, and copies of the same sent to the members of the committee, and to persons throughout the State prominently identified with horticulture and fruit-growing, who, although not connected with the Association, will, it is hoped, continue to manifest an interest in the practical work of the Society, and be eventu-



COL. McFARLAND'S LATE YELLOW.

A SEEDLING OF LATE CRAWFORD.

Origin near Harrisburg, in 1874, on the grounds of Col. McFarland. Tree healthy, vigorous and a good, regular bearer. Fruit large and handsome. Skin, rich yellow, with red cheek. Flesh, yellow; red at the stone. Quality good, resembling Susquehanna. Season, October 15 to 20. Freestone.

ally induced to join. To the queries propounded, answers were received from every section of the State, and, from the large amount of correspondence that accumulated, an effort has been made to collate such information as will prove of interest to the present meeting.

Apples.

It is curious to read the various answers to the first question contained in the circular: "What can be said of the yield, quality of fruit, and damaging causes, if any, in your locality?" From the eastern portion of the State, the reply has been invariably the same—"the poorest crop ever known in this section;" whereas, in the northern tier of counties, and throughout the entire western part of the State, the crop was one of the largest and best that has been known for many years. The causes of failure in eastern Pennsylvania are ascribed to the "off year," damage sustained by trees during the severe weather of the previous winter, the injury done by frost in the blossoming period, and the excessive drought of the summer, which caused the fruit to drop. The apple aphis was very bad in the spring, and the ravages of the codling moth were added to the general destruction of what fruit had set. In some localities in central Pennsylvania, a terrible storm of hail in the latter part of May put a damper upon all expectations. In western Pennsylvania, there were fewer codling moths and other insect pests than usual. In some of the northern counties, where attention is principally directed to stock-raising and dairying, the great yield of apples was a surprise to the oldest inhabitants.

Pears.

There was a fair average crop of pears throughout the State, and the fruit was harvested in good condition. In most sections there were fewer complaints in regard to blight than usual. Some counties report an increased interest in the planting of trees, and more attention is being paid to the cultivation of this very desirable fruit. Owing to the failure of the apple crop in most sections of eastern Pennsylvania, the insect enemies which generally disturb the apple were turned in quest of other provender, and directed their attention to the pear. While, therefore, there was an abundance of pears, their quality was much affected. In many of the counties west of the Allegheny mountains, the yield of pears is reported to have been immense. In regard to the newer varieties, it is amusing to note the different opinions. Some growers speak of the Kieffer and Le Conte pears in terms of profuse praise, regarding them as the greatest acquisitions in many years, while others regret that they were ever introduced. A number of correspondents agree that the Kieffer is of fine appearance and valuable for the market, but not fit to eat. Others with whom it has been fruiting for a few years aver that it has exceeded their most sanguine expectations.

Peaches.

The reports from almost every section of the State in regard to the peach, one of the most luscious of fruits, are unfavorable, and on account of the reverses with which most growers have met, there is danger of its cultivation being abandoned. As in former years, the disease known as "the yellows" appears to be the principal cause of failure, and its origin seems to be as great a mystery as ever. Almost all agree that the only remedy is to destroy the tree, root and branch, as soon as it has given indications of having been attacked. Late frosts had much to do with the destruction of the crop in those sections of the State where attention is paid to peach culture. Light soils and elevated situations are recommended for peach orchards. Some growers prefer a southern or south-western exposure, but the majority of the correspondents favor locations exposed to the north or north-west. While a northern exposure has its advantages, a belt of timber which will afford protection from high winds will be found almost indispensable.

Plums.

Curculio is the chief enemy of the plum, and this fruit does not appear to succeed except in town yards or close to poultry-houses, where the ever-busy "biddy" can destroy the larvæ of insect pests. Trees along dusty roads have also been known to bear well, the curculio being disturbed in its operations by the ever-rising dust caused by passing vehicles. There are very few sections of the State in which any attention is paid to this crop, and the yield is regarded as very uncertain. Some correspondents report, however, that by jarring the trees in time and judiciously thinning out the fruit, they experience no difficulty in securing a crop of plums every year. A curculio-proof variety has not yet been discovered. The rot is to be dreaded more than the curculio. Of the different varieties, the Lombard and Richland are the most generally recommended. A gentleman in an interior county, who is devoting much attention to fruit-growing, confesses to having seen last fall the first half bushel of cultivated plums that had been produced in that section of the State in many years, and says that all efforts to raise plums in his vicinity have resulted in failure.

Quinces.

The reports received show that greater attention is being paid to the cultivation of quinces, orchards of this valuable fruit having been planted in a number of localities. Wherever grown to any extent, the crop proved unusually fine, and several correspondents report quinces as having sold as low as ten cents per dozen. The principal enemies of the quince are the borer and codling moth, and these insects proved very destructive in some sections. The Champion, Rea's Mammoth, and Orange have succeeded best, and the first mentioned is especially commended. Large and handsome specimens always command a remunerative price, and hence it is to the interest of growers to plant those varieties which produce the finest fruit.

Cherries.

The reports in regard to cherries do not agree. Some correspondents report an abundance, but the majority state that the crop was but medium. In various localities, it was a total failure. The results were not alike in the same county. In Berks, for instance, some growers had a short crop, the cause of which they ascribe to the blossoms having been damaged by frost. Other growers had an exceedingly fine crop of cherries, and they reported that they experienced less trouble from the depredations of birds than in previous years, because the birds subsisted on the seventeen-year locusts, which were very abundant in eastern Pennsylvania last June. In western Pennsylvania, the cherry crop suffered from the ravages of rose bugs, and in other sections of the State, rainy weather in the latter part of June caused the fruit to decay. A number of correspondents report that the Morellos are the only varieties that succeed. Others speak in high terms of the Early Richmond, Governor Wood, and similar early kinds. The much denounced English sparrow has turned up as an enemy to the cherry crop. A friend noticed the blossoms falling in great numbers from several of his choice cherry trees. As there was no wind at the time, and the blossoms descended as though a sudden snow storm had set in, curiosity led him to investigate the cause. He soon found it; for, as he appeared on the scene, out of the trees flew flocks of sparrows. An examination of the trees revealed the fact that a great many buds had been nipped off close to the branches.

Grapes.

Grapes seem to have done remarkably well all over the State. The season was favorable, and the drought experienced during the summer caused them to ripen evenly, and rather earlier than usual. In certain sections, however, the crop was poor, the vines having been injured by the severe weather of the previous winter. "Bagging" has proved a great success, wherever carefully followed, and the thin-skinned varieties have been much improved by this treatment. Of the many reports received, nine out of ten place the old, reliable Concord at the head of the list. One gentleman writes, that in setting out a vineyard several years ago, of six hundred and sixty vines planted, three hundred were of the Concord variety, and his only regret is that he did not plant six hundred Concords. The Worden and Moore's Early are referred to very favorably by a number of correspondents. Of the new varieties, the Niagara appears to fully come up to all that has been claimed for it. A letter written by S. J. Parker, of West Chester, to ex-President Josiah Hoopes, which will be found accompanying this report, gives some valuable information in regard to the new grapes.

Small Fruits.

Cultivators of small fruits had much to contend with last year. The severe weather of the previous winter affected the raspberry and blackberry canes, and the cold spring and late frosts injured strawberries in the blossoming period. Strawberries were also about two weeks later than usual, and, although there was a fair yield, the summer's drought, which set in with the beginning of July, shortened the bearing season. Currants were generally a poor crop, and in a number of places were destroyed by slugs and worms. More "orange rust" than usual was observed among blackberries. Various suggestions are given by correspondents in regard to varieties of small fruits. The Sharpless continues to be a popular strawberry with most growers, although some prefer the Mt. Vernon for marketing, and rely upon the Sharpless for private use. The Cumberland, Charles Downing, and Crescent Seedling also claim many friends. In raspberries, the Cuthbert, Brandywine, and Reliance have the strongest indorsement. The Wilson, Snyder, and Kittatinny are the favorite varieties of blackberries. In currants, Fay's Prolific has given good results.

Vegetables.

The production of vegetables, whether for home use or for market, is a very important branch of horticulture, and the inquiries of the committee were properly extended to ascertaining what attention is paid thereto throughout the State, and what the results of the past season were, whether favorable or otherwise. The proper care of the kitchen garden is of the utmost importance on every farm. The greatest blessings which a kind Providence can bestow on man, in his sublunary state of existence, are health of body and peace of mind; and the pursuits of gardening eminently conduce to these. Unfortunately, the tillage of the garden is frequently delegated to the female members of the family, who, with the boys on the farm, are expected to furnish the supply of culinary vegetables from one year's end to the other. With this lack of attention on the part of the "lords of creation," it is not singular that on many farms the list of vegetables grown is of very limited extent. Generally, it it is only on truck farms, where vegetables are produced for market, that an assortment of all kinds can be found. Whether the tastes of the city people are more fastidious than those of the country folks we do not know, but certain it is there are many luscious vegetables which are rarely found in farmers' gardens, and should be given a place. The fact is, therefore, recorded with pleasure that many correspondents report increased attention paid to the cultivation of vegetables. In most of the interior counties, vegetables are only grown for home use, but near to the large cities there are numerous market gardens, and the industry is a profitable one. Some complain of over-production and unprofitable prices during the past season, but even with such a condition of affairs, the growing of vegetables for market has proven more remunerative than the raising of wheat and other cereals. The season of 1885 was very favorable for late vegetables, but the dry weather of July and August shortened the yield of summer varieties.

The cold, late spring also delayed gardening operations greatly. Nevertheless, the experiences of most growers were quite satisfactory. In some sections of the State, notably in eastern Pennsylvania, the potato crop was a failure, but through central and northern Pennsylvania, there were prolific returns, and the markets have been supplied at a slight advance on the figures of the previous year. The diminished yield of potatoes was more than made up by the great abundance and excellent quality of cabbage, celery, turnips, and other late vegetables. The reports in regard to new varieties are meager. The catalogues of seedmen, as they make their appearance at the beginning of each year, are full of novelties, each dealer having specialties of his own which he insists are the greatest acquisitions of the age; but there are very few varieties introduced, with glowing descriptions of their merits, that withstand the tests of time, or that are the equal of the old standard kinds. What is mostly wanted is a proper regard for keeping the established varieties pure, and furnishing fresh seeds, true to name. Experimentation, however, should be encouraged, and a really good thing should be widely disseminated. There has been a great improvement in potatoes in late years, but, of the hundreds of varieties originated, there are only a few kinds worthy of general cultivation. One of the most profitable vegetables is celery, and of recent varieties the White Plume, after having been thoroughly tried, appears to be very desirable for early crop. The public inclination is towards the white and yellow kinds, well bleached and perfectly solid and crisp. It will be found difficult to change this for anything else, and yet the pink or red varieties are superior in flavor and quality, while the grower will find them hardier and more solid, and hence better keepers in winter.

Shrubbery, Plants, and Flowers.

Information was requested in regard to any new things useful for the ornamentation of garden, yard, or lawn that may have been tried during the past few years, but only a few correspondents gave heed to this inquiry. Some stated that a growing taste is being developed, but that floriculture is but imperfectly understood. The majority had nothing new to suggest. An impetus has been given of late to the culture of chrysanthemums, especially to the Japanese section. The new varieties are marvels of beauty. The influence of the various chrysanthemum shows, held in the large cities, has been felt in the improvement of varieties and the increased interest manifested in this section of the floral kingdom. Amongst the most satisfactory in newer shrubs, although not strictly novelties, Correspondent Josiah Hoopes, of WestChester, mentions the fôllowing: *Exochorda grandiflora*, *Viburnum plicatum*, *Weigelia* (*Diervilla*) *candida*, *Spirea callosa superba*, *Spirea crispifolia*, *Rhodotyphus*, *Kerrioides*, and the dwarf Japan maples. For bedding purposes, the succulent plants are greatly in favor, especially the many attractive varieties of *Echeveria*. The *Santolima* for silvery effect, and a pretty, purple-leaved *Oxalis* for dark lines, are now being largely grown. E. H. Cocklin, of Bowmansdale, suggests that beautiful and hardy tree, the *Cladastris Tinctoria*, or "Yellow Wood," as certainly deserving of a place in every farmer's yard. It is exceedingly gratifying to know that greater attention is being paid to the adornment of farmers' door-yards. Evidences of this laudable tendency are revealed on all sides by a drive through almost any section of the country. Years ago it was unusual to find a green-house upon the farm, while now such buildings are met with quite frequently. Propagating establishments are also multiplying, and with every lot of nursery stock delivered, will be found a few ornamental trees, deciduous shrubs, and plants intended for home adornment. J. E. Jamison, of Cocolamus, Pennsylvania, member of the General Fruit Committee, writes: "There is a growing disposition for the cultivation of shrubbery and flowers, and no country home is considered finished until it is well adorned with evergreens, shrubs, and flowers; but, I am sorry to say, there is not a nursery or greenhouse in Juniata county." Here is a chance for some enterprising party.

The Storage of Fruit.

"What modes of storing fruit are observed in your vicinity, and what has been your experience?" This was question No. 11 of the circular, and elicited very few new ideas. The prevailing methods of storing apples throughout the State are the putting of them in cellars and vaults, and burying them in pits. A number report very little experience, owing to short crops, and others state that the fruit is packed in barrels and crates, and then thrown upon the market, so as to be worked off as soon as possible. Several correspondents in southern and western Pennsylvania, remote from markets, report that fruit, berries, and vegetables are prepared for shipment by the process of evaporation, and they speak in high terms of the evaporators of the American Manufacturing Company. One writer reports a profit of one hundred dollars per acre by evaporating raspberries. In Berks county, refrigerator buildings and retarding houses have been found of great advantage in keeping fruit, and especially of holding it back until advantage can be taken of higher prices; but this method of storage appears to be in its infancy in Pennsylvania, as there are very few other localities where it is observed. A Tioga county correspondent, (S. M. Baker, Brookfield, Pa.,) facetiously remarks in regard to storage: "The common mode of storing fruit in this section has been to put them in a warm cellar, bank it up warm, and after the work of decomposition has gone on until toward spring, shovel up and carry out, and dump."

General Observations.

A request was made for any facts of importance which may have come under the notice of correspondents during the past year, and a brief reference will be made to the more interesting matters contained in the sub-reports. Much valuable data is contained in many of these communications, and it is to be regretted that the same cannot be given in full.

Although the length and severity of the winter of 1884–85 gave rise to the apprehension that the fruit crop would be greatly retarded and injured, a comparison of the yearly records of the dates on which the different fruit trees began to blossom shows that such apprehension was unfounded. The trees bloomed only a little, if any, later than usual, and the buds were apparently unhurt by the cold weather, although late frosts subsequently injured the blossoms in many sections of the State.

Pennsylvania had an abundant visitation last year of seventeen-year locusts, but only one correspondent refers to them, and there was no damage to the fruit crop as the result of their presence. These insects confine their ravages to young chestnut timber and the tender shoots of oak trees. Fruit trees are not attacked to any extent. In addition to the seventeen-year species, some sections of the State had a simultaneous visit from the thirteen-year locusts. Such simultaneous appearance of the two broods had not occurred, we were told by entomologists, since 1664, and thus another remarkable feature was added to this remarkable age.

E. P. Swift, of Allegheny county, writes: "I have found the growing of sunflower seed rather profitable here. The expressed oil can be sold at paint factories, where it commands as high a price as the linseed." In regard to vegetables, he says: "Many acres in this county are devoted to the growing of garden vegetables. The past season may have been a favorable one or not, just as you view it, for this crop. There was an over-production of them, so that they could not be sold at a profit, and many of our market-gardeners have found that they have lost money in the business this year. They were frequently obliged to almost give away their wagon loads during the season."

R. M. Welles, of Bradford county, writes as follows in regard to "strawberry culture:" "In growing strawberries, I have learned by experience that the blossoms are much more liable to be killed by late frosts if the plants are mulched. If a frost follows a cold, wet, and cloudy day, clearing off at night, *then* the mulched and unmulched plants fare the same; but, on a sunshiny day, the unmulched soil warms up, and the heat absorbed by the bare earth is given off at night and protects the blossoms, while often a light mulching so shades the earth as to prevent its being warmed, and the blossoms suffer in consequence. My experience has taught me that winter mulching should be removed before blossoming takes place, and replaced only after the fruit has set. Strawberry plants upon high lands and hillsides are less exposed to late spring frosts than those upon low and flat lands."

Joel A. Herr, of Lycoming county, has the following to say in regard to an important topic: "The nomenclature of fruits has been badly injured in this county by dealers and agents, who sold fruit under any name you wanted, and, consequently, while we have a good deal of choice fruit, it has been wrongly named, and is sold under wrong names. I would suggest that a commission be appointed by the State to examine and report on varieties sent them, with a view to securing uniformity of names."

In relation to the exhaustion of timber in the lumbering districts of the State, and the future bent of the operations of the inhabitants, W. H. Johnson, of Elk county, writes: "I throw broadcast the ashes from our mill every spring in my apple orchard, and I think I have just as nice, large, and smooth apples as any in the county. I have heard others make this remark. I do not know why this should not be a pretty good fruit country for most all kinds of fruit, unless it should be too cold for some varieties. We live on the divide between the Susquehanna and Allegheny rivers, so you see we are pretty high. This was once a great lumber region, and people have not taken near as much interest in farming and fruit-growing as they will undoubtedly in the future, as the lumber is nearly all exhausted, and we will have to put our attention to something else."

B. C. Dawney, of Fulton county, reports great destruction to fruit-trees by borers and rabbits, and adds that not one tenth of the trees planted grow.

Hon. Henry M. Engle, of Lancaster county, gives his experience as to bagging grapes, as follows: "Our experience in bagging grapes has thus far been satisfactory. *First.* It prevents rot. *Second.* It is a protection against insects and birds. *Third.* The fruit can be left on the vines until the main crop is out of the way, when prices invariably advance a few cents per pound."

In reference to growing vegetables for market, E. Satterthwait, of Montgomery county, says: "Growing vegetables for market is not a profitable business in this State, and never will be, because our soil and climate not specially adapted to it. As it costs no more now to send produce to market for a thousand miles than it does ten miles, vegetables can only be grown to profit in situations especially adapted to them. The Philadelphia and other eastern markets are now supplied with celery from Michigan, with cauliflower from the vicinity of New York and Baltimore, where they have the benefit of the sea air, which is essential to them. And so it is with everything. Our markets are glutted with all kinds of vegetables from the far South, before we can begin to plant here."

William Voris, of Northumberland county, recommends close planting in apple orchards in his locality. He writes: "One thing I have noticed in the past few years is that close planting has done by far the best, all things other being equal. My orchard is twenty-five by twenty-five feet, and has done very much better than one a few hundred yards distant, planted at the same time, out of the same nursery and same varieties, and same kind of soil, distance thirty-five by forty feet;

also, two others, one twenty by twenty feet, and the other thirty by forty feet, the close one producing four times the amount of the other, the last two being on the same farm. I know of several like cases, which go to convince me that close planting is the best in this locality."

As to further remarks upon "fruit culture," the undersigned chairman would refer to a carefully written paper on the subject, which has been prepared at his request by Christopher Shearer, of Tuckerton, for many years the largest grower of fruit in Berks county, who has devoted the greater portion of his life to this industry. It will be found to contain many practical suggestions.

General Fruit List.

At the last annual meeting of the Association, held in the city of Lancaster, the special committee appointed to prepare a "list of fruits" to be recommended for general cultivation in the State, reported in favor of turning the matter over to the General Fruit Committee, which report was adopted. In accordance with this action, the following question was asked each correspondent: "What varieties of the several kinds of fruit can be recommended for general cultivation in your locality?" The result was not at all satisfactory, as a number of correspondents failed to report, and others acknowledged themselves unequal to the task without conferring with other fruit-growers in their respective counties. Some gentlemen sent in very complete lists, and if all had done the same, an attempt might have been made to arrange lists for various districts. It would be a good plan to divide the State into four districts—eastern, central, northern, and western. The writer believes it to be impossible to arrange a general fruit list for the entire State. He considers, with his old-time and venerable friend, Levi S. Reist, of Lancaster county, that everything depends upon soil and situation. Mr. Reist writes: "When and how to plant, and what varieties; how to prune and cultivate, are well enough to consider; but one variety may do very well in one place and fail half a mile away. This has been my experience for forty years. I have, for instance, the Pennsylvania Red Streak on southern and northern slopes, a stream of water dividing the two. The northern slope brought me a good crop for four years in succession, while the southern was an entire failure." Christopher Shearer gives his views upon the same points as follows: "As to the most desirable varieties to plant, so much depends upon the various conditions of soil, locality, exposure, &c., in which particular varieties thrive best, that I hesitated to give recommendations of special sorts. Plant none that are not large, prolific, and good keepers." Your chairman would recommend that another effort be made next year to prepare fruit lists suitable for various sections of the State. As a number of members were kind enough to express their preferences, a list of the more popular varieties of fruits is herewith presented:

Apples.

Summer Varieties.—*Astrachan Red, Benoni, *Carolina Red June, *Cornell's Fancy, *Early Harvest, Early Strawberry, *Early Ripe, Keswick Codlin, Primate, Queen, *Summer Hagloe, Summer Pearmain, Summer Rambo, Tetofsky, Townsend, *Yellow Transparent.

Autumn Varieties.—*Gravenstein, Jefferis, *Maiden's Blush, *Porter, *Strode's Birmingham or Dumpling.

Winter Varieties.—*Baldwin, *Ben Davis, Betsy's Fancy, Dickinson, Domine, Ewalt, *Fallawater, Fameuse, *Grime's Golden, *Krauser, Northern Spy, Pennock, Rawle's Janet, Red Romanite, Ridge Pippin, Roman Stem, *Rome Beauty, Russet (American Golden), *Russet (English), *Smith's Cider, *Smokehouse, Swaar, Tewkesbury Winter Blush, Turn-of Lane, Westfield Seek-no-Further, *Willow Twig, *Wine, *Winesap, *Winter Sweet Paradise, *York Imperial.

Crab Apples.—*Hyslop, Large Yellow, †Transcendent.

Pears.

Summer Varieties.—†Bartlett, Beurre Giffard, Bloodgood, Brandywine, †Clapp's Favorite, Doyenne d'Ete, †Manning's Elizabeth, Osband's Summer.

Autumn Varieties.—†Beurre d'Anjou, Buffum, Belle Lucrative, †Doyenne Boussock, †Duchesse d'Angouleme, Flemish Beauty, Howell, †Keiffer's Hybrid, Louise Bonne de Jersey, †Rutter, †Seckel, †Sheldon.

Winter Varieties.—*Dana's Hovey, †Lawrence.

Cherries.

Heart Varieties.—Black Eagle, Black Tartarian, Coe's Transparent, Delicate, †Downer's Late, †Elton, †Gov. Wood, Knight's Early Black, Manning's Mottled, Ohio Beauty.

Bigarreau Varieties.—†Napoleon, †Yellow Spanish.

Morellos and Dukes.—†Early Richmond, English Morello, Mayduke, Reine Hortense.

Plums.

Coe's Golden Drop, †General Hand, †German Prune, Huling's Superb, †Imperial Gage, Lawrence's Favorite, †Lombard, †Prince Engelbert, †Richland, †Union Purple, Yellow Prune.

Native Varieties.—DeCaradeuc, Wild Goose.

Peaches.

Crawford's Early, *Crawford's Late, *Druid Hill, *Early Rivers, George the Fourth, Golden Dwarf, *Heath Free, Large Early York, Moore's Favorite, *Mountain Rose, *Oldmixon Free, *Reeve's Favorite, Salway, *Smock's Free, *Stephen's Rareripe, *Stump the World, Susquehanna, *Troth's Early Red, *Ward's Late Free.

Quinces.

*Champion, Orange.

Grapes.

Agawam, Allen's Hybrid, August Giant, *Brighton, Centennial, *Champion, Christine, Clinton, *Concord, Croton, El Dorado, *Empire State, Goethe, Hartford Prolific, Jefferson, Martha, Miner Seedling, Moore's Early, *Niagara, *Pocklington, Salem, Telegraph, *Vergennes, Wilder, †Worden.

Foreign Varieties.—Black Barbaressa, †Bowood Muscat, Buckland's Sweetwater, †Grizzly Frontignan, †Gros Colman, †Hamburg (Black), †Hamburg (Muscat), Lady Ascot, Muscat of Alexandria, Prince Albert, Stanwick Seedling, White Sweetwater, White or Imperial Tokay.

Mulberries.

Downing's Everbearing.

Currants.

†Fay's Prolific, Lee's Prolific, †Red Dutch, †Victoria, White Grape.

Gooseberries.

†Cluster, †Downing, †Smith's Improved.

Raspberries.

Brandywine, Caroline, †Cuthbert, †Gregg, †Hansell, Herstine, Rancocas, Reliance, Souhegan, Turner.

Blackberries.

†Kittatinny, Snyder, Taylor's Prolific, Wilson's Early.

Strawberries.

Charles Downing, Crescent Seedling, †Cumberland Triumph, James Vick, †Manchester, †Mt. Vernon, †Sharpless.

* † Varieties marked with a star or dagger are the most suitable for market and general purposes. All the other varieties are excellent, but mostly new, and can be safely planted in small lots for family use.

Respectfully submitted.

CYRUS T. FOX,
Chairman.

READING, PA., *January 20, 1886.*

Mr. HOOPES moved a vote of thanks to the committee, and especially to Mr. Fox, for the exceedingly able and interesting report, which was unanimously adopted.

President COOPER. I would add that this is much the ablest report we have ever had.

Mr. ENGLE. I am pleased to note the success of our General Fruit Committee in getting reports from counties hitherto unrepresented. Some years ago, when chairman of said committee, I made a similar effort, but with very indifferent success.

Mr. FOX. Generally speaking, the replies received from such correspondents were more complete and satisfactory than those from members of the General Fruit Committee. Some of them, though strangers, were sufficiently interested to inclose fee of membership. I have had reports from Elk, Tioga, Bradford, and Clarion, and if the good work is properly kept up by writing our correspondents again, and showing an interest in their correspondence, I hope in two years to have reports from every county in the State.

Discussion on the Report.

Mr. DAVIS. On the subject of bagging grapes, my experience does not coincide with that of others. Last season I got five hundred paper-bags, of which about half were put on. I was glad I did not get them all on, as those that were bagged rotted badly.

Colonel McFARLAND. I got about three hundred pounds from Juniata county that were bagged, and kept them three to four weeks. They were of excellent quality and in fine condition. My friend reported the protection by paper-bags a great success.

Mr. Davis. From a plot of five hundred Concords planted two years last spring, I took five thousand four hundred pounds. I would like to know how we can realize better prices.

Judge Stitzel. Bagging grapes is no longer an experiment here. We have them fresh from the vines from August to December. I think my friend waited too long before putting on the bags. They ought to be put on when about half grown. In my opinion, the flavor is improved, and the fruit can be kept a month longer. I use two-pound manilla bags and put them on with pins; at first I used strings, but I much prefer pins.

Mr. Cooper. Have you succeeded in ripening Catawbas in bags, and can they be left upon the vines until frost?

Judge Stitzel. Yes, sir.

Mr. Hoopes. It is now the universal practice with us; in fact, it has become a necessity. On a large vine of Duchess this season, we bagged about one half the bunches. Those not bagged were white with mildew, while the others were in good condition.

Mr. Meech. At Vineland, bagging grapes enhances their value about one cent per pound. Col. Pearson, of New Jersey, has made experiments, and says that where vines are protected by a roof or covering, bagging is not necessary.

Mr. Cooper. We cannot grow Catawbas in our locality without protection, and I am glad to learn that by bagging them we can succeed.

Mr. Parsons. In France, vineyardists cover their vines with canvas. Some years ago, on a fence between my carriage-house and stable, I planted some Delawares. On the fence, where they had no protection, they mildewed, while under the eaves and gables of the buildings they were free from mildew and of excellent quality. If we can secure good crops, free from mildew, by protection of this kind, why go to the trouble of bagging?

Mr. Engle. There is no question as to the utility of covering the vines by canvas or roofing. Prof. Saunders has frequently recommended this plan. Some years ago, I learned by experience that vines thus protected will do much better. I had an Isabella and a Catawba vine under a porch roof at my house, that always matured crops of excellent grapes, when all others of those varieties were worthless with rot and mildew. As to bagging, I have succeeded admirably, especially with some varieties of Rogers' Hybrids. They deserve more attention, as they have keeping qualities equal to any varieties grown. If for no other reason, I would bag on account of the birds.

On motion, the further discussion of this question was postponed.

Annual Statement of the Treasurer.

Mr. Thomas, Treasurer, submitted the following report, which was read and referred to Auditing Committee, consisting of Messrs. Davis, Bartram, and High:

Geo. B. Thomas, Treasurer, in account with State Horticultural Association of Pennsylvania.

1885.

		Dr.
January 21. To cash on hand in Farmer's National Bank of West Chester, ...		$435 12
January 21 to 28. To cash for annual dues, ...	$66 00	

January 30.	To cash from J. B. Rutherford, treasurer State Agricultural Society, amount of premiums for largest collection grapes, apples, pears, and peaches, $10 each, at State Fair, Philadelphia, September, 1884,	$40 00	
February 3 to October 9.	To cash for annual dues,	20 00	
October 9.	To cash donated by Ellwanger & Barry, Rochester, New York,	2 00	
	To cash from thirteen members as postage on transactions at 25 cents each,	3 25	
			$131 25
			$566 37
1885.			
			Cr.
January 22.	By cash paid Edward Satterthwait for express charges on two boxes from Kennett Square, September 8, 1884,	$2 45	
	By cash from Cyrus T. Fox, for printing circulars, reports, express, stationery, and postage,	6 75	
	By cash paid H. A. Chase, postage expended in getting reports on varieties of fruits,	13 20	
	By cash in getting same for envelopes, blanks, and note heads for purposes as above stated,	14 25	
	By cash paid C. Cooper for postage, muslin, and cards,	1 40	
	By cash paid *New Era*, printing and posting notices,	5 25	
	By cash paid E. B. Engle, postage, express, and stationery and printing,	20 91	
	By cash paid E. B. Engle, salary, 1884,	25 00	
	By cash paid Jeremiah Jones, services as janitor,	2 00	
October 2.	By cash paid P. E. Hiller for fruit, packages, expressage, and labor for exhibitions at State Fair, Philadelphia,	11 00	
9.	By cash paid E. B. Engle, express and freights on reports to and from various parties as per vouchers,	15 48	
	By cash paid same for water color drawings of petunias,	7 00	
	By cash paid same. printing circulars,	2 00	
	By cash paid same, stamps, stationery, express, &c., from January 23 to October 1,	18 89	
			$145 58
	By balance,		420 79
			$566 37
January 20, 1886.	To cash on hand in Farmer's National Bank, of West Chester, Pennsylvania,		$420 79

To the President of the State Horticultural Association of Pennsylvania:

The undersigned, your committee appointed to examine the report and vouchers of George B. Thomas, Treasurer of the Association, respectfully beg leave to report: That having examined the account, and compared it with the vouchers, find every charge proper and approved by the officers, and the balance remaining in his hands due the Society.

All of which is respectfully submitted.

EDWIN DAVIS,
J. HIBBERD BARTRAM.

Mr. SATTERTHWAIT. Have the premiums awarded at the State fair last fall been paid? I know some seventy dollars were awarded.

Mr. HARRISON. Part of the premiums only were paid. There were not sufficient receipts to pay all the premiums offered.

Judge STITZEL. As the Pennsylvania Agricultural Society has usually offered us special inducements to make exhibits, and has always paid our premiums promptly heretofore, I would suggest that any premiums awarded us last fall be remitted, in consideration of the fact that the receipts were not sufficient to pay all expenses and premiums.

Judge STITZEL subsequently made a motion to this effect, which was adopted.

Adjourned.

THURSDAY MORNING.

Called to order by President COOPER, 9.15.

REPORT OF COMMITTEE ON NOMINATIONS.

Judge STITZEL, chairman of Committee on Nominations, submitted the following list of officers:

President—CALVIN COOPER, Bird-in-Hand.

Vice Presidents—JOSIAH HOOPES, West Chester; HENRY M. ENGLE, Marietta; EDWIN SATTERTHWAIT, Jenkintown.

Recording Secretary—E. B. ENGLE, Waynesboro'.

Corresponding Secretary—W. P. Brinton, Christiana.

Treasurer—George B. Thomas, West Chester.

Librarian—Thomas J. Edge, Harrisburg.

Report of committee was accepted, and the aforenamed were duly elected by ballot.

REPORT OF GENERAL FRUIT COMMITTEE.

The PRESIDENT announced that further debate upon the report of General Fruit Committee would be in order.

Mr. FOX. As we have other important business before us, had we not better defer further discussion of General Fruit Committee's report for the present? I have an article on "Fruit Culture," by Mr. Shearer, prepared by request, which might be read now, and discussed in connection with the report.

A motion to that effect having been made and adopted, Mr. Fox read the following essay on

FRUIT CULTURE.

Mr. President, and Ladies and Gentlemen: The fruit orchard—considering the peculiarities of climate, soil, and locality in which fruit is grown, its different species and numerous varieties, and the diversified methods of its treatment—comprises a subject almost boundless in its ramifications and extent. I shall not attempt to traverse it, even in a general way. All I can undertake in this essay is to touch upon a few salient plants, and briefly give the results of my experience, which embraces the greater part of my life.

When this country was first settled, all sorts of fruit adapted to this climate grew in abundance, without special care or skill in cultivation; but, at present, we have to contend with diseases, winter-killing, and the ravages of insects, little known in former times. Failure is frequent, and some sorts easily produced a century or half a century ago, can now be raised only with excessive care, and with little or no profit.

This declension in the growth of fruit cannot be attributed to atmospheric or climatic changes, for no important modifications of this kind have occurred; nor is it ascribable, in any material measure, to deterioration of varieties, or to superior methods of culture employed by our predecessors. Insects are, in part, responsible for it; but, in my opinion, the principal cause is the exhaustion of soil. This is a widespread and admitted evil in all the older States, and is alone sufficient to account for most of our troubles with the orchard.

General Observations About Fruit-growing.

If this position is correct, it is evident that fruit-growing cannot be successful unless the land is restored to its pristine state of fertility. All that is necessary to this end is the application of an abundance of mineral salts, the most important of which are phosphates, potash, and lime, and a liberal supply of barnyard manure. Unless these fertilizers are added to the soil, we cannot expect thriving and remunerative orchards, on land that has been subjected to exhaustive cultivation. Virgin soil, of course, does not need these requirements, and, other things being equal, is preferable for orchards to land long in cultivation. It is not advisable to plant trees on soil previously occupied by the same species, though the deficiencies of such soils, to a great extent, may be overcome by an abundant supply of the right kinds of manure.

A loamy soil is the best for most kinds of fruit. The land for most fruits should be more or less elevated, and a northern exposure is generally the best, though not indispensable. The best results are obtained if the land is subsoiled before planting the trees, in order to make it absorptive and retentive of moisture and manure. This enables the roots of the trees to penetrate deep enough below the surface to obtain moisture and nutriment in times of drought. If the land lies low, it should be drained, for fruit trees do not thrive in wet or water-logged soils.

Orchards should be well cultivated, and kept clear of grass and weeds, but the cultivation should be done in spring and in the early part of summer, in order to give the growing wood time to mature, and thereby enable it the better to withstand the severe cold of winter. Hoed crops, if well manured, may be raised with advantage to the orchard, because they require cultivation, and, therefore, keep down grass and weeds. But better still is the practice of letting pigs and poultry run under the trees, because they are destructive to insect life, and keep the orchard clean. Mulching is highly beneficial, and should be done wherever the material can be had at a reasonable expense. No crops of grass or grain should be grown in an orchard.

Especial care should be bestowed upon the selection of varieties of fruit. Plant but few sorts unless you have special reasons to the contrary, and none that do not thrive in your immediate vicinity. If a variety succeeds well with your neighbors, and on soil similar to your own, it is safe to plant it, otherwise not. Be cautious about adopting new varieties, however highly recommended. Give them a trial, but do not plant largely before having fully tested them.

It is an indispensable prerequisite of every kind of fruit that it be hardy and prolific. It matters not how excellent the quality may be, if the tree is not productive, it will not be profitable. Of course, superior quality is always desirable; but a kind that yields abundantly and is passably good, should always be preferred to one that is exceedingly good, but sparingly productive.

Opposed to Pruning.

I am disposed to take an extreme position in regard to pruning trees. So many orchards have been crippled and ruined by pruning, that my advice is, don't. Never learn to prune, and never prune. I have yet to see an orchard that has been benefited by the application of the knife, and I have never seen one that has suffered from the want of its use. The proper balance between root and branch is always maintained in a healthy tree; and that balance is disturbed or destroyed whenever the tree is divested of any of its parts. Excessive pruning is fatal, and moderate pruning is deleterious to a degree commensurate with the extent to which it is applied. In taking this view, I except grapes, small fruits, and sickly or recently transplanted trees. Training the branches low increases the thrift of the tree; but since cultivation is, in most cases, beneficial, it is expedient to remove such of the lower limbs as interfere with free cultivation. If the stem of a young tree is trimmed up gradually to its desired height, it will grow more stocky and vigorous than if the lower branches are all removed at once. If the variety is too prolific a bearer, it is admissible to cut off some of the wood to prevent exhaustion of the tree by overbearing; but it is better, though more laborious, to thin out the superabundant fruit in spring.

Trees should be planted so far apart in the orchard that when fully grown the outside branches of adjoining trees do not touch. It matters little whether they are planted in squares or break-joint, if sufficient space is left between them to admit plenty of air and sunshine. I prefer planting in squares.

The Criterion of Success

In fruit growing, as in all other industrial pursuits, is the profit which it yields. At present, a considerable portion of the fruit that is consumed here is raised in other localities. Many apples are brought from places farther north, and still larger quantities of peaches, relatively speaking, from sections south of us. As regards other fruits, our markets are mainly supplied from the neighborhood. The question here arises whether we can profitably compete with more distant and more favored localities. I think the answer to this question depends upon the care and attention we bestow upon our orchards, and it seems to me that our proximity to our own markets should more than compensate for any disadvantages in other respects under which we may happen to labor.

Observations on the Apple.

The soil and climate of this section of the country are favorable to the production of the apple in any desired quantities; and I know of no reason why we should not raise enough to supply our own markets, together with a large surplusage for exportation. This fruit will grow on all kinds of soil, if properly enriched; but elevated gravel lands are the best. There is an apple tree on Mr. Smeck's farm, in this county, on high, gravelly ironstone land, which, in 1873, measured sixteen feet eight inches in circumference, five feet from the ground. I measured it myself, and as it was thrifty and vigorous at that time, there can be no doubt that it is considerably larger now. I think it is the largest apple tree in the world. The other apple trees on the same place are also unusually large. These facts indicate the soil best adapted to the growth of the apple.

As to the most desirable varieties to plant, so much depends upon the various conditions of soil, locality, exposure, &c., in which particular varieties thrive best, that I hesitate to give recommendations of special sorts. Plant none that are not large, prolific, and good keepers. I raise the Baldwin to a very large extent, because with me it has been the most profitable. But the reason is because it keeps well in an ice-house, which some other sorts do not. The Baldwin is liable to drop, to mature early in the season, and to rot before the approach of cold weather. It, therefore, requires an ice-house to make it profitable with us.

Apple trees should be planted about two rods apart; or forty to an acre. They should not be trimmed up higher than is necessary to admit of cultivation. Do not thin out the wood. Cultivate to the middle of July to keep clear of grass and weeds: then cease, so as to give the growing wood time to fully ripen. Keep off the borer, and plant only hoed crops in the orchard. There is no danger of applying too much manure to an apple tree.

The Culture of the Pear

Should be similar to that of the apple, and a rich and thoroughly-cultivated soil is even more indispensable. It can be successfully grown here. The blight in many places is a formidable obstacle to pear culture. Although I have not consciously used any means to prevent it, I have never had it in my orchard. My pear trees stand on a somewhat light, rich, gravelly, fairly elevated limestone land. What the particular circumstance is that gives immunity to my pear trees against blight, I am unable to say, and, therefore, I will not venture to surgest remedies for the disease.

There are summer pears from which selections of good varieties for successful culture can easily be made, but I know of no winter pear that is not open to serious objections. I raise only the Bartlett for profit. Its ripening can be retarded for several months in an ice-house without deterioration of its qualities. This enabled me, some years ago, to obtain very large prices for it in New York city. But more recently, owing to the greatly increased supply, the New York market has heavily declined, and, during the last season, it offered no advantage over market at Reading, excepting that it enabled the producer to sell in larger quantities. It is advisable to plant enough varieties of the pear to distribute the period of ripening over the whole summer and fall, and to depend mainly upon the markets in our vicinity for the disposal of the crop. The Reading or "Hoch" pear, half a century ago possessed all the qualities of an excellent winter pear, but either the tree or the soil on which it grows has so far degenerated that the fruit has lost its merits. If it could be restored to its original excellence by high cultivation, which is not probable, I should prefer it to all other sorts for winter use.

Remarks on Peach Culture.

The peach requires care and attention in our latitude. Occasionally, large and profitable crops are produced; but, if we are too sanguine of success, we may be sadly disappointed. I believe, however, that if we attend to all the requirements of successful peach culture in this latitute, our efforts will be fairly rewarded.

Peach trees must be planted on high, rich, loamy soil, or the chances of success will be small indeed. All that has just been said about the cultivation of the apple and the pear applies with two-fold force to the peach.

Views Concerning the Yellows.

The peculiar evils to which this fruit is subject are the yellows and the borer. To guard against the yellows, it is necessary to set healthy buds on healthy stocks. I raise my nursery trees from pits of the natural fruit grown in Tennessee, and use no buds except such as are grown on healthy trees; and, whenever a tree shows signs of decay, I dig it up by the roots and burn it. This is a safeguard against disaster to the peach orchard from the yellows. The cause of this disease is famine followed by the severe cold of winter.

The peach tree has a dainty and ravenous appetite, and relishes rich and nutritious food, well seasoned with such condiments as the salt of potassium, phosphorus, and lime. These make it jubilant, healthy, and strong. If not well fed, it dies of hunger and cold. We call the disease yellows, but *starvation* would be a more significant name. In the south, where the winters are not severe, there are no yellows. Never plant a peach tree on poor soil if you wish to retain its health.

Protection against the Borer.

The borer is fatal to all peach trees not fully protected against its ravages. This can be successfully done by the application of the following wash:

4 gallons whitewash,
2 quarts clay,
2 quarts fresh cow droppings,
1 quart lye that bears an egg.

Mix these ingredients to a proper consistence with water. Remove the ground from the top of the roots close to the tree, and apply the wash to the exposed roots and to the whole trunk of the tree, including the hollow between the lowest branches. Cover the roots again with earth. The wash can be applied very expeditiously by means of a corn-broom, and no special pains need be taken against splashing any of the substance on the ground, for the women will raise no objection to such a mishap, and the tree will eagerly appropriate the drippings, and put them where they will do the most good. The wash should be applied twice every season, namely, about the end of May and the end of August. I have found this an infallible protection of peach and apple trees against the borer. For apple trees, one application of the wash every season is sufficient.

Requirements of the Plum.

The plum requires a rich and rather heavy soil, and thorough cultivation. There are some varieties that are curculio-proof. These can be raised without difficulty, but they are of inferior quality. The best sorts are extremely subject to the depredations of this pest of the orchard, and the fruit is in great danger of being destroyed unless efficient preventives are applied. Pigs and poultry running in sufficient numbers in the orchard afford adequate protection against these insects, and I have found that frequent and perfectly clean culture under the trees prevents the eggs from being hatched, or the young insects from coming to maturity. I have raised large crops of plums from trees so treated, without applying any other remedies. There is a magnificent wild-goose plum tree in my yard, large enough to yield crops of six to eight bushels of fruit, and it blossoms luxuriantly each year, but I do not think that it has yielded so much as half a peck of plums in its best season. Perhaps it might do better in lighter soil.

The Quince and Apricot.

What has just been stated in regard to the cultivation of the plum is equally suitable to that of the quince. This fruit, however, thrives best in low, moist, and rather heavy soil. The Champion is a variety that is large, beautiful, good in quality, and proof against the curculio. I prefer it to all others that I have tested. It may, in fact, be regarded as a close approach to a perfect quince.

Of the apricot, but little need be said. The care above recommended for the peach and plum will be fairly rewarded if bestowed upon the apricot. It should have protection against the cold of winter, and its time of blossoming should be regarded as far as possible. A northern exposure, sheltered by buildings or woods, is the best. It is a favorite victim of the curculio.

Advice as to Cherry Culture.

The mode of culture of the cherry tree is exceptional. It does best on rather poor soil among grass and weeds. It needs no cultivation; in fact, it succeeds best without it. Now, why is this so? Surely not because the tree does not grow more rapidly in rich and cultivated soil; but because it is so liable to winter-kill that a luxuriant growth of its wood cannot outlive a severely cold season. In this respect, it presents quite a contrast to the peach. Fortunately, it does not starve on a low diet, and hence does not get the yellows. Never plant a cherry tree on low or heavy soil. Of sour cherries, the May Duke and Early Richmond are good vareties to plant. The sweet cherries are more delicate, and more difficult to raise, than the tart, and there is not so great a demand for them in the market. There are several well-known kinds which may be raised with fair prospects of success. It is expedient to plant such sorts as do not ripen at the same time.

About the Grape and Varieties.

Our clear, warm summer atmosphere is so well adapted to the growth of the grape, that at no very distant day we may hope to equal, if not excel, the best grape and wine-producing countries in the world. Of all the grapes that I have tested, the Clinton has proved the most profitable for wine, and the Concord for the table. They both withstand the phyloxera very well, but neither of them is of the first quality. There are several other varieties that greatly excel them in quality, but being less productive and more difficult to raise, they cannot be produced in our section with profit. Grapes grow to the highest perfection on light, greatly elevated, and moderately rich soil. Horace Greely has said of the grape: "Trim short, trim long, or trim not at all, but plant grapes." My experience is that the grape should be trimmed sufficiently to prevent overbearing, but enough wood should be left to insure a good crop. Some varieties require more pruning than others. The Clinton needs less than most other kinds.

Production of New Varieties.

I now beg leave to offer a few remarks on the production of new varieties of fruit. This subject is so important, and yet so imperfectly understood, that a little theorizing may be pardonable, if not unavoidable. In a state of nature, when similar conditions for long ages prevail, fruit trees are highly conservative, and like the Medes and Persians, tolerate no changes in their constitution and habits. But, when exposed to the influence of civilization, they soon, like many members of the human family, contract the alluring habit of sporting. This, however questionable in man, is a virtue in a tree. When the forces of a highly stimulated soil, the unimpeded rays of the sun, and the free circulation of the air are made to act upon a wild plant or tree, they impart to it new and increased energies which impress themselves in varied forms upon the rising generation; and if a tree once begins to sport, progeny will continue to do so in increased ratio, until finally its descendants, as regards varieties of fruit, are nearly all sports. Hence, there is no difficulty in obtaining new sorts from advanced varieties. But, unfortunately, the changes are seldom in the right direction. They are mostly retrogressive—many blanks, and few prizes. Now, many of our best varieties are accidental seedlings. This raises the question whether we can, by skillful management, increase the tendency of a given fruit towards greater perfection. It seems to me that there can be no doubt of the practicability of this much-desired end, and that the method of its accomplishment is obvious from what we already know of the causes of variation.

In the first place, we know that the more vigorous the growth of a tree, the larger and finer will be its fruit. Therefore, we should raise new varieties only from seeds produced in the richest soil compatible with healthy growth.

Secondly, since some species and varieties thrive best in certain localities, we should always take the seed from such localities as are best adapted to the growth of the particular kinds which we desire to improve. For example, Mr. Smeck's orchard above mentioned would be an excellent place to improve the apple. But if any particular variety of the apple does not thrive there, that variety could be more successfully improved in a locality more congenial to its growth.

In order to advance a fruit to high excellence, the land on which the trial is made should be favored with superior requirements as regards climate, soil, locality, exposure, humidity, &c., &c., and should be stimulated to the highest possible degree of fertility by the application of the most appropriate kinds of plant-food. The seeds should be raised on trees of different varieties, naturally or artificially crossed, and possessing the qualities which we intend to combine and improve. This process, continued through several generations with the best products so obtained, will, in all probability, finally yield a perfect fruit.

What is Desired in Varieties.

The perfect winter apple has yet to come. The same may be said, even more emphatically, of the pear. The wished-for apple must be large, red, of the finest flavor, melting, a more than good, but not an enormous, bearer, a vigorous, healthy, and upright grower, hardy enough to withstand the coldest winters, and must keep in an ordinary cellar until a new crop has matured. These qualities are partly possessed by many different varieties of the apple, but not until they are all united in one shall we have the true *ne plus ultra*, seek-no-further, apple.

We are sadly in want of a pear that will keep throughout winter and spring, and be good for use during these two seasons. We have no variety that approaches these requirements in any appreciable degree. Can we not, with proper endeavors, supply this need?

There are many good peaches, but they are more or less liable to suffer in our latitude from the extreme cold of winter. Our efforts should be directed towards hardening the trees. The Globe peach, if I may be permitted to say a word about it, possesses all the desirable qualities of a perfect fruit. The tree is an upright, symmetrical, thrifty, and vigorous grower, and good bearer; the foliage is healthy, and the fruit is very large; color, yellow, with a red blush, and flavor of the best quality. It would be desirable, however, if the Globe, like our best peaches generally, were more iron-clad, the better to endure the extremely cold winters to which the northern States are exposed.

We have varieties of the plum possessed of all the excellence of quality that can be desired. We should make them proof against the curculio. The same remarks apply to the apricot.

As regards the cherry, both the tree and the fruit are deficient in hardness and durability. The former is liable to perish from cold, and the latter from continuous rain. Our labors for improvement should tend towards hardening both tree and fruit.

Judging from the nature of the grape, I can see no reason why we should not be able to produce a vine in this latitude that will resist the coldest winters without shelter, in the open field; that will bear the attacks of the phyloxera with impunity, and that will yield the most excellent fruit for the table and for wine without high cultivation. Such a fruit would be a blessing to the millions. May we not hopefully await its advent?

Suggestions as to Improvements.

Now, if we supinely depend upon accidental seedlings to pour these invaluable *desiderata* gratuitously into our laps, the day of their realization will be in the distant future. Why may we not imitate the breeders of domestic animals in the improvement of their stock? An accomplished pigeon-fancier will place any named feather, in less than half a dozen years, upon the progeny of a given specimen of the tribe. Are plants more intractable, less receptive, less amenable to progressive changes than animals? Rather the contrary is the fact. We have more difficulties to contend with in improving an animal than a tree or plant.

If a man, and especially a young man, engaged in fruit-culture, would intelligently devote his talents and his leisure time to the production of improved varieties of fruit, as above indicated, there are good reasons to believe that his labors would, with inconsiderable expenses, be crowned with a gratifying measure of success. It would not require many years to improve even a long-lived species like the apple, because the results could be greatly expedited by grafting the young seedlings on older trees prepared for that purpose.

It would be a tempting inducement to fruit-growers if Congress were to offer a premium to the originators of improved varieties of fruit. Our leading agriculturists would, no doubt, willingly serve without compensation on a committee appointed to award the prizes. This would, at least, direct attention to an important subject.

And now I will close by expressing the hope that the members of this Society, so many of whom are residents of the same county as myself, may reap all the enjoyments, profits, and success which are due to the noble task of studying, improving, and producing the health-giving fruits of the country—God's best gift to man.

President COOPER. Mr. Parsons, of Flushing, Long Island, is with us by invitation, and has prepared an essay on "Horticulture." He will be obliged to leave to-day, and it will be in order to hear him now.

Mr. PARSONS then read the following essay:

ORNAMENTAL HORTICULTURE.

In addressing an audience of intelligent horticulturists, it is not easy to select subjects of both novelty and interest. Some years since, I had a discursive talk with you on the decadence of horticulture, which seemed likely to be crowded out by the rush of money-getting, by the advent of many unreliable traveling venders, and by the facilities for seeing all the world, which, among the rich, destroyed a desire for country homes. The money craze still continues as strong as when Jacob traded with Laban, but among the masses of money-getting men a desire for trees and plants has come, which, in the aggregate, is larger. The traveling venders have not disappeared, but among them have come many honorable and reliable men, who see that it is to their interest to supply the best things, while, among the people at large, is a growing feeling that all merchandise can be obtained fresher and cheaper of the producer, just as milk from the cow at three cents is better than that from the grocery at eight cents.

The facilities for travel are still greater than they were, and still militate against the existence of costly country villas, while, at the same time, they enable city merchants to have their moderate country homes in suburban towns, and these homes are so numerous that, in the aggregate, they benefit horticulture much more than the costly villas, many of which are going to decay. Thus far, therefore, the decadence has ceased, and the growth has again commenced. This growth brings with it a desire for the now rare and novel trees and shrubs.

To name even the larger part of these would require too much time. I can call your attention only to a few of the most prominent. Among the first of these is

The Rhododendron.

This plant has been well known in America, among a few, for half a century, but to many it is comparatively unknown. The field for its culture has been thought narrow, because so large a part of those planted have failed. A large proportion of these have been imported, and their failure has been owing to several causes — difference in soil, difference in climate, and difference in hardiness of sorts. The largest growers of rhododendrons are in England, the climate of which is moist and free from our extreme heat and cold. They are generally grown in peat, because they are impatient of clay, and peat is a good material for lightening it when there is moisture enough to prevent injury. With us in America, the dryness and heat of summer make heat the very worst material for the soil. Even in England it cramps the roots, and imported plants have thus small balls of roots scarcely half the size of those of the same age grown in light, loamy soil here. From these small balls the roots, if of hardy sorts, will finally emerge, and, in a few years, make good plants, unless a very extreme winter should occur while they are in this transition state. There are very few sorts, however, which will bear the change from the moist and equable climate of England to the extremes of dryness, heat, and cold in America. These sorts are well known, and are now succeeding well in localities which have been found unfavorable to other kinds. A rose is a rose everywhere, but there is a marked difference in hardiness between the Tea and the June rose. In the rhododendron, the difference is just as strongly marked. Among the various sorts sent out by honorable houses in England, there are many varieties of exquisite tints, which are hardy there, and thus sent out by their growers in perfectly good faith as hardy plants, but, when planted here, the same varieties may die the first year, or may seem to grow for a few years, and come to an end during the first really hard winter. One of these results is certain. In a recently-published paper from C. M. Hovey, whose experience in this plant is well known, he states that he bought, in 1884, in England, a number of rhododendrons supposed to be hardy. Eleven of them proved to be hardy; of the others he writes as follows:

"All the plants were carefully planted in well-prepared soil, and every attention given to have them succeed. For one or two years they all appeared about of the same hardiness, when we had one of our severe winters, and then all were seriously injured and partially killed but the above-named sorts.

"I at once came to the conclusion that no rhododendron was perfectly hardy unless grown from *Catawbiense*. I began raising seedlings from those that survived, and have produced a race just as hardy as the oak. To be sure, there are no crimsons and scarlets among them, but white and all intermediate shades between that and *Purpureum elegans*.

"My imported plants are now forty years planted, and fully fifteen feet high, as are also many of the seedlings I raised from 1847 to 1850. From 1844 to 1860, I planted more than two hundred of the finest varieties of rhododendrons to be procured in England, Belgium, and France, and I have not to-day one single plant left in the open ground.

"It was after such experience that I made the statement that none of the so-called hardy hybrids were perfectly hardy in our climate, and, although it was denied by many cultivators, the statement of the *American Garden* seems to corroborate my opinion of twenty-five years ago."

Our own experience for thirty years has been the same. During that time we have imported, grafted, and grown over three hundred varieties, and we can say with truth that we have never received a hardy rhododendron from France, Belgium, or any continental country. This is because the blood of their sorts is that of arboreum or ponticum, which are uniformly tender.

In England, they have endeavored to preserve as much as possible the qualities inherent in *R. catawbiense*, and thus we have obtained thence a few reliable hardy sorts, with occasionally some additions, which, united with seedlings originating in this country, make a list of some twenty reliable sorts. Of these there is no one which has the value of the *grandiflorum;* while not equal to the tender sorts in brilliancy of color, it has a good crimson tint, with a good form, grows thriftily and buds abundantly. I have one plant which bears annually over two hundred clusters. This variety came from England thirty years ago as *roseum grandiflorum*, but it must now have passed away there, for we have imported from nearly all the principal growers in England the *roseum grandiflorum*, and every other *grandiflorum*, without receiving our own favorite variety. This is not surprising, for in their climate there are many higher colored sorts, but for America the *grandiflorum* is the one variety *par excellence.*

The American seedlings, General Grant and President Lincoln, are higher in color and equally hardy, but will never be as abundant, because they are more difficult of propagation. The *Rhododendron maximum*, with its two varieties of pink and red, will always be worthy of planting, because they are native American sorts of entire hardiness, and also bloom in July, after the flowers of all the other varieties have passed away.

In rejecting the tender sorts for open culture, I would not lose sight of their great value for winter gardens under glass. There are scarcely any plants which will flourish in a cool house more noble in form and beautiful in their flowers than such varieties as Concessum, Lady Cathcart, and others. A rhododendron house with opaque roof and glass sides uncovered in April and roofed with canvass while in bloom, would be a surprise and pleasure to those who have not seen one.

We have asserted that over a large extent of territory, rhododendrons will be successful if confined to a few hardy sorts. For their success a light garden soil is the best; if the soil is clay it should be lightened with sand. Leaf mould, rotten sod, or surface soil which has been heavily manured the season before are all beneficial. Mulching is useful, but it should not be allowed to remain during the growing season—from April 15 to July 15. The soil needs air and sun for at least three months of the year. Some liquid or surface manure can be profitably applied during the growth. It is asserted that rhododendrons will not flourish in limestone soil. The only way is for every one to try his own locality, and if the soil is not suitable, make it so with rotted sod, leaf mould, or light rich surface soil. Rhododendrons are heavy feeders, and should not be planted too closely. They need abundant room for their roots when properly supplied with liquid or surface manure. The coarser will cripple the finer varieties. When thus crowded they should be transplanted to more space.

It is also a great mistake to plant under trees; the leaves will be of a darker green, but will not flower as freely as when planted in the sun. It may be somewhat different with plants imported from Europe or some climate more moist and cool than ours. The shade may help them as they struggle to survive a cold of fifteen degrees below zero in winter, and one hundred degrees above zero in summer. Such changes will test the character of their blood.

It is always well to have, if possible, groups of hardy evergreens on the north and west, sufficiently distant not to interfere with the roots, and sufficiently near to protect from the worst winds. The force of cold winds is very injurious to even the hardiest, broad-leaved evergreens. With the *grandiflorum* and some of the hardy American varieties, there is a tendency to set too many buds. While this is an excellent quality, it is better not to let all the buds flower, but to break off a part of them according to the age and vigor of the plant, which will thus be kept in good condition, with healthy wood and fine flowers. The seed-vessels of rhododendrons should be broken off immediately after flowering, to insure a healthy growth.

The rhododendrons are known for their rich, broad evergreen foliage as well as showy flowers. There is, however, one deciduous variety, which deserves mention—*R. dauricum.* It is very scarce, but remarkable for its giving the first shrub flower of the spring—coming before the leaves, and possessing the charms which first things always give.

The most desirable flowering shrub after the rhododendron is the hardy

Ghent Azalea,

which can be very properly grouped with rhododendrons, for its deciduous and not remarkable foliage is aided by that of the rhododendron, which is evergreen, glossy, and rich, while its flowers are more refined than those of the rhododendron, with colors unknown to the latter. The rhododendron surprises, and the azelea charms. When all the varieties are in bloom, the many colors from white and orange to crimson and scarlet, in all their varied tints, make a boquet of exceptional beauty. It is adapted to a wide field in climate, and is found equally abundant in the hills of New England or the mountains of Georgia. In its native habitats, the colors are few; by careful cultivation many varieties have been produced, among the best of which will be found the American seedlings.

Those of the American *calendulace* and *nudiflora* types are much hardier than those of the Asiatic *ponticum* breed, the leaves of which become rusty and whitish in the summer, as do those of the *azelea molis* which should be planted apart from the Ghent varieties. This species from Japan has larger flowers, and was expected to surpass the Ghent azalea. This it cannot do, for it has only two distinct colors, and is sometimes hurt by early frost. It may be valuable, however, for early flowering and forcing. All azaleas can be deprived of part of their buds with advantage as we have described for the rhondodendron.

For grouping rhododendrons, the taller sorts, like *album elegans*, should be planted in the center, and the other sorts surrounding it at a distance of three or four feet. Outside of these should be planted azaleas at two to two and one half feet distant. The late blooming *R. maximum* have for its companions azalea, a *viscosa grandiflora* A very nice finish to a rhododendron and azalea bed can be made by planting first *azelea amaena* and then *Daphne cneorum.*

The first is a most charming dwarf evergreen plant, perfectly hardy, never growing as high as the deciduous azalea, and bearing a great profusion of crimson amaranth flowers with most striking effects. The *Daphne cneorum* is a creeping evergreen plant, and eminently adapted for edging. There are few things more charming than its miniature clusters of pink flowers and their delightful fragrance. Plants in pots are always better for transplanting to open ground. To be kept healthy, it should always be pruned after flowering. When a rhododendron group is first planted, vacant spaces offend the eye; these can be planted with scarlet salvia; their long stems are hidden by the rhododendron foliage, while their brilliant scarlet heads glow over the group like rubies or emeralds.

Coniferous Trees and Shrubs

are essential to all well-planted places, but we are always pleased with the broad-leaved evergreens, which can be grouped by themselves or with the rhododendrons.

Among the first of these may be named our American holly—*Ilex opaca.* As a small tree standing alone, as for an alley or screen, it cannot be surpassed by any broad-leaved evergreen. For an edge it is equally effective, and its glossy leaves are some of its chief ornaments. Although found in various sections of our country growing freely in the woods, it is rarely seen in gardens or on lawns. Those who have endeavored to transplant it from the woods have generally failed, while they have found the seed very difficult to germinate. We now, therefore, graft it on the thrifty English stock, which is hardy here in its roots and main stem, but not in its branches. Two objects are thus attained—berry-bearing plants by grafting only from such, and certainty in transplanting by growing it in pots. A plant in pot, twelve to eighteen inches high, certain to live, is better than one five high inclining to die.

I need not describe to you the *Kalmia latifolia*, or laurel of the woods, where its superb masses show what it can claim under cultivation. It will grow almost anywhere, and should scarcely rank second to any American small shrub. It is not adapted, like the Holly, for small trees or for hedges, but for grouping on a lawn it is unequaled.

The *Audromeda Catesbaeii* stands prominent for its rich foliage, tinted both in spring and autumn, and its graceful racemes of white flowers. The *Audromeda floribunda* forms its flower buds in the autumn, and gives a mass of white bell-like flowers in the early spring, which are very attractive.

The *Mahonia japonica* and *Aquifolia* are both nearly evergreen, and are very desirable. For massing in a bed, there are few things finer than the last. *Prinos glabra* is worthy of planting for its dark evergreen leaves.

Crataegus Pyracantha fructu lutea has many charms. It is attractive planted alone; it makes a close, thorny hedge, impervious even to a chicken; its flowers are white and in clusters; its berries are orange and very showy, and its leaves, which are a bright green in June, take on a bronzed tint in winter. Its great fault is its shyness of transplanting. Tree-box can be used with great advantage, and is much neglected. It is hardy, and, therefore, always green, and attains great age. One at an old homestead of my fathers is said to have been there one hundred and fifty years ago. The best variety with the largest leaf is *Rotundifolia*, then *Handsworthii*, *Latifolia Glauca*, and Japan golden.

The evergreen *cotoneasters microphylla* and *rotundifolia* are good for rock-work.

The *Limonia trifoliata*, the only hardy variety of the orange family, is a very attractive plant, and its fresh, green foliage is scarcely surpassed. Trained upon the house for several years, and its brightness relieved against the house, it is very effective. Coniferous trees and shrubs are worthy of our attention, because they are beautiful themselves at all seasons, and because they give a life and brightness to the winter landscape.

If planted with deciduous trees, they should not be near enough to touch them. For this, seventy-five to one hundred feet would be safe with even so spreading ones as the white pine. When the two classes are closely intermingled, the evergreens generally suffer. If evergreen effects are desired, it is better to plant each family in belts or groups in which any interference with each other would not be noticed. For a single specimen of large size my favorite is the white pine. I like the majestic spread of its branches, and the music of its leaves. An avenue of these is always grand. It never gets rusty, and its only fault is that the exceptional fragility of its wood makes it susceptible of injury from ice storms. Of the several classes of coniferous trees I would rank the pines first, then the *abies*, and then he *picea*.

Among the pines, the best are *austriaca*, *strobus*, *sylvestris pyramidalis*, *densiflora*, *excelsa*, *resinosa*, *ayacahuite*, *uncinata erecta*, *strobus pumila*, *mughus*, *mughus pumila*, *mughus compacta*, *cembra*, *mandshurica*, *monspeliemsis*, *monticola*, *massoniana*, a variety from Japan, with most refreshing light green foliage; *massoniana variegata*, a most delicate and charming variety, with the bright fresh green of its parent, and a delicate gold color, separated by well defined lines; *massoniana aurea*, a newer variety, the whole plant being of a deep rich solid gold, in early autumn and winter. These last two are most remarkable trees, and if they retain their character when of larger size, their sight will be worth a pilgrimage. The family of pines generally do well and are deserving favorites. In the family of *abies*, there are now all sorts of dark green, light green, variegated and glaucous tints, with weeping and spreading forms. The best known of this family are the *excelsa*, or Norway spruce, and the *canadensis*, or hemlock. The former is beautiful when young, but becomes thin and rusty with age. This can be obviated by cutting down when that condition comes, and if we plant coleus every year, we can afford to replant evergreens every ten years. The hemlock makes the most ornamental hedge known, if carefully trimmed. The *orientalis* is the most valuable of its family, because it retains its beauty when large. A specimen we planted forty years ago charms artists by its remarkable revelations of light and shade between its branches. There are few among the conifers of later introduction more admired than the *pungens* from Colorado. Its form is compact and good, and its color a most soft and light sage-blue tint. *Alba* is the American white spruce, with a light glaucous tint, and *alba aurea* is remarkable for its golden variegation; *inverta* is a creeping variety that branches closely, hugging the stem and with judicious pinching can easily be made to assume any form; *pyramidalis* is a well shaped upright variety; *conica* is a dwarf-growing, compact sort, and its neat shape is bringing it into much favor for walk and window decorations; *Gregoriana* and *nigra pumilac* are dwarf varieties rarely growing over two feet in height, but of thrifty habit and well adapted to small places; *elata* is a grand tree for a large place, throwing out its great arms with a habit of branching very much like that of the *arancaria imbricata*, or the *satis buiea; diffusa* is a half dwarf and fine sort; *canadensis macrophylla* is always admired for its dwarf yew-like character and its thrifty growth. For form, however, the gem of all gems in this family is the *weeping hemlock*. My windows look upon one which I planted some years ago, and which is now ten feet high and ten feet in diameter. My eyes constantly turn to it, and I can compare it with nothing so well as an evergreen fountain, with close, compact, spray-like branches in place of the water. This is certainly one tree which every man should plant.

The *piceas* are clearly defined in their distinction from the *abies*, and have rich and attractive qualities. The king among them is *Nordmaniana*, for its sturdy, thrifty, compact form, and for its dark and glossy richness of color. It makes a strong contrast with the silvery blue tint of *Abies pungens*. Next will come *Cilicica*, with its lighter green, and then the *Cephalonica*, which I thought one of the finest conifers when I saw it in its native habitat in the mountains of Cephalonia. *Concolor* from Colorado is one of the best, both for form and hardiness.

Japonica is yet very rare, but is exceedingly handsome; look down on it from above, and it has a dark glossy richness like that of *Nordmaniana;* look at it from below, and you see a uniform silver whiteness. *Nobilis glauca* has very attractive and solid qualities. *Pectinata pendula* is very picturesque, and can be formed into all sorts of shapes. The branches hug the stem very closely, and by tying up the leading stem, it can be made to attain any desired height and become an evergreen column of great beauty. *Pectinata compacta* is one of the best dwarf conifers, and *Hudsonica* is still more dwarf, with a fine glaucous tint. These are the leading *piceas*, while there are many others worthy of attention. They like heavy, deep, rich ground, and with them superb effects can be obtained.

All these *Pinus abies* and *piceas* can be much improved when young by pinching off the leading shoots in June.

It is always desirable to plant evergreens on the north side of a house, not only because they will shelter the house from the northwest and north winds, but because they make also an excellent shelter for rhododendrons and other plants which are impatient of cold winds rather than cold. If planted on the south side of the house, they will prevent the access of the needed southerly winds in summer.

The Smaller Evergreens.

Of the smaller evergreens, the *Thuja or Arbor Vitæ* are best known. We can notice only a few. For extreme cold, the *Siberian* is the best; for form, the *pyramidalis;* for color, *columbia aurea* or Peabody, *maculata aurea*, *Vervaineana aurea*. The *Taxus*, or yew, has many good qualities; it transplants well, will do well in the shade, and for certain effects is indispensable. Some of the varieties require shelter, but some are entirely hardy with us. Among them are *aurea*, for its rich golden color; *cuspidata*, for its exquisite green all the year; *canadensis*, for its light green tint; *adpressa*, for its robust and unique habit, and *repandens*. In value, except for color, this last should be first on the list. It has never been touched by a cold even of twenty-two degrees below zero, is exceedingly thrifty, and has a rich dark foliage. My own specimen is three feet high, with a diameter of twelve feet. It is admirable for any situation, particularly rock work. *T. hibernica*, or Irish yew, is unequaled for its form, is hardy with me, but is not so in some places.

A new Japanese introduction, *Sciadopytis*, is a plant of much beauty, but is so slow that half a century is needed to develop it.

The *Biota* somewhat resembles the *Thuja* and has many varieties. Among these, *elegantissima* stands first, and is a very ornamental plant. It is upright in its habit, with a color of fresh clear gold in the summer, and bronze through the late fall and winter. Excellent qualities inhere in *filiformis*, *pyramidalis nepalensis*, *fuchsiana*, and others.

The Juniper Family.

The *Juniperus*, to which belongs the well known red cedar, is a valuable family. The *hibernica* is known for its columnar habit, the *suecica* for its fresh greenness, *suecica nana* for its dwarf character, *canadensis* and *prostrata* for their silvery leaves and trailing habit, *squamata* for rock-work, *glauca* and *venusta* for their silvery tint, *oblonga pendula* for its very graceful drooping habit, *sinensis argentea variegata*, a very choice and hardy variety, with compact habit and white tipped or variegated branches. From Japan there have come some charming varieties of this family among which are *japonica aurea*, with entirely golden leaves, *japonica aurea variegata*, with gold variegated in the green, and *japonica alba variegata*, with white tints variegated in the green.

One of the most valuable families introduced from Japan is the *Retinospora; plumosa aurea* is the most useful and distinct. It grows well, holds its bright golden foliage through the summer and winter, thus surpassing the golden yew, while it cannot equal the latter in the brilliancy of its June color. For a border or hedge it is very ornamental. *Squarrosa* has a light bluish tint; *filifera* and *filifera aurea* are very graceful drooping varieties, one with a rich green, and the other a bright golden tint; *obtusa* is the largest of the family and a noble fern-like tree; *obtusa pendula* is also very charming for the graceful down turn of the end of its branches; *obtusa nana* is very much admired for its dwarfness, its compact fern-like habit, and its rich dark green. The fern-like habit is observable also in *pisifera nana variegata*, *lycopodioides*, *filicoides*, and other sorts. The whole family is very interesting and remarkably adapted to our soil and climate.

Among Deciduous Things.

I have given so much time to rhododendrons that there is very little left for things deciduous, and I will be able now only to allude to certain families and the necessities of their treatment. I would call your attention first to the great value of *ampelopsis veitchii* for covering buildings. When given a rich soil, it grows with great rapidity, and will soon cover rough boards with the most charming foliage. The leaves lap over like shingles, thus protecting the house from rains. Planted at the foot of old evergreens, it will cover the trunk and branches, and in autumn gleam like fire in a pine forest. No plant more valuable has been introduced. On a fence near my house a very striking effect has been produced by the *akebia quinata*,*ar istolochia sipho.*

Lonicera reticulate aurea and *Jecôma grandiflora.* The *akebia* holds its leaves very late, and they contrast well through the summer with the broad leaves of the *aristolochia*, while on the other side of the latter the delicate *lonicera* creeps in and out, dividing its favors between the broad shield of its neighbor on one side, and the rich orange flowers of the *tecoma* on the other. If I could have only one flowering vine, it should be this *tecoma.* It comes in August, when flowers are rare; its bloom lasts for weeks, and it is a refined as well as very showy flower.

I need not tell you of the different varieties of *clematis*, with all their beauty. They are deservedly growing in favor. I would call attention to the value of the *lonicera* for many purposes—for flat beds on lawns, for mounds of any height desired, for columns closely compact or loose, for covering dead trees or fences. There is no hedge which has half the beauty of a wire fence covered with honeysuckles; it has compactness without stiffness; grace, with wildness and beauty both of flower and foliage. A gap is fatal to the appearance of an ordinary hedge, for it is difficult to fill it. A gap in a honeysuckle hedge can be at once filled by the adjacent vines. For the purpose I have mentioned, the best adapted are the *sempervirens*, *brachypoda halleana*, *magnevilla*, *sinensis*, *belgica*, *and reticulata aurea.*

In leaving the vines, I would say that there are many others beside those I have mentioned which are worthy to be planted; but my space is drawing to a close, and I am compelled to omit them. Few plants are growing in favor as much as Japan maples. The rich variety and variegation of color, from the transparent ruby tint of *atropurpureum* to the rich gold of *japonicum aureum*, from the white-veined leaves of *reticulatum* to the pink tips of *roseopictis*, the colors charm the eye as do few other plants. They are dwarf enough to be called shrubs, and therefore adapted to the smallest places. They are perfectly hardy, and therefore adapted to a wide field of culture. There is no combination of scarlet and gold which can charm like a group of *atropurpureum* and *japonicum aureum.* All who see them wish for possession, and the only question now is how to obtain a supply. The propagation here is not easy, and we have attempted several times to import them from Japan, the best kinds not being abundant in Europe. The importations from Japan have not been satisfactory. They were necessarily sent through San Francisco, and at a season of the year when they were frozen if sent over the Sierras, or heated if sent by the southern route.

If any happened to come alive, several years were required to bring them up to the condition of plants grown here. But the most serious difficulty is in the sorts. Under Japanese names, we do not get the varieties which we value most here. Our last invoice from Japan, containing eighty sorts, was almost worthless. We thus import no more, and are thrown back upon our own propagation.

I would add that when they are grafted and established, their culture is easy. They can be planted in nursery rows, and cultivated with the plow.

With the Japanese maples in past times, there came, among many other valuable things, the *Japanese chestnut* and the *Japanese weeping cherry*. This chestnut has a fruit more than twice the size of the American, and bears at a very early age, sometimes with three feet of height. This last habit gives it great value.

The weeping cherry has a habit like that of the weeping beech; while it throws its side branches down, its leader continues to grow upward, and thus it may in time grow as large as the weeping beech. In the spring it is covered with masses of rose-colored flowers, and attracts the admiration of every one. There is no reason why my specimen should not reach the size of its neighbor—a double flowery cherry, which has a trunk twelve feet in circumference. Should it do so it will be worth seeing.

Time will not allow me to describe even a small part of the large list of deciduous trees and shrubs There is one species, however, which deserves mention for the difficulties which surround both its propagation and transplanting. The *Chinese magnolia*, in all its varieties is admired by every one who is familiar with its beauty, which I need not describe to you. Its great fault, however, is its shyness of transplanting. which increases with its age to such an extent that a plant one foot high is more valuable than one six feet.

This is more especially true of those grafted on the *M. acuminata*, the root of which is much more difficult to transplant successfully than is that of *M. tripetala*. On the latter, therefore, it should always be grafted. For the first two years after grafting, it would be better to keep it in pots, from which it can be taken at any time to send out. When too large for the pot, it can be transferred to the open nursery ground, and, by transplanting every two years, can be kept in condition for sale. There are, however, difficulties in its propagation which unless overcome, must keep it always a scarce plant.

It is a good plan to grow in pots all trees which are difficult to transplant. Any one knowing the nature of Pepperidge, Stuartia, Hickory, Concordia Oak, American Holly, and others, will gladly take a plant one foot high, that will surely live rather than one six feet high, which will probably die.

I would call the attention of all lovers of beautiful things to the large number of trees and shrubs which are ornamental for their berries or seed. The purple fringe, the euonymus, the mountain ash, and the snowberry are well known, but there are few who buy for their ornamental seed such trees and shrubs as the kolrenteria, the hawthorn, the evergreen thorn, the berberries, the viburnums, the sumacs, the callicarpa, the eleagnus longipes, ampelopsis japonica, celastrus scandens, clematis orientalis, ilexopaca, mahonia japonica,and many others. All these plants have beauty of foliage or flower, but they should be sought for that which has often a greater charm, the seed or berry. There is one plant growing wild which like the bitter sweet is known by all young men and maidens who love the woods in October, but which is rarely seen in nurseries or private grounds, and yet this plant, the *Prinos verticillata* is surpassed by none for the beauty and profusion of its orange-colored berries.

In conclusion, let me remind you, that the field for ornamental horticulture is a wide one, and all countries are enabling us to fill it. Nature is infinite in her variations for the skillful hands and fertile brains which carry out her suggestions and improve her creations. It remains for us, gentlemen, you who are yet young, and we who are nearing the border-land, to respond heartily, and with earnest effort, to all the opportunities which she may present. There should be no decadence, but progress always, in the science we all love—Horticulture.

Mr. Cooper. A very able and interesting essay, and contains a volume of information in itself.

Mr. Eby. I would like to ask Mr. Parsons where the "Holly" tree can be had.

Mr. Parsons. They are not generally grown by nurserymen, but I think they can be had from Mr. Meehan. At Flushing we have them in pots.

Mr. Meech. It is difficult to transplant, but I have succeeded by stripping off the leaves. The great evaporation of moisture through its foliage causes death. I transplant in early spring.

Col. McFarland. What rapidly-growing vine would Mr. Parsons recommend for covering a roughly built wall?

Mr. Parsons. I think honeysuckle would be good, though it is not an evergreen. *Ampelopsis* would be very fine.

Mr. Engle. There is one point in Mr. Shearer's essay that should not be passed by without consideration. I refer to his position concerning "yellows" in the peach. I cannot agree with him that it is but another name for starvation.

Mr. Moon. Mr. Satterthwait has prepared something on this subject, and it would be well to hear his views before entering into a general discussion.

Mr. Satterthwait. I might say that the occasion of my preparing anything is an article by Mr. Rutter in our report for 1884. The article referred to was not read at our meeting, and knowing nothing of its purport I was not able to reply.

When asked by our Secretary if I did not wish to say something at this meeting in answer to Mr. Rutter's paper, severely criticising me for something I had said on this subject, it occurred to me that I ought to do so, inasmuch as his three and one half page article seemed to be entirely devoted to the crushing out of some supposed heresies of mine. And as the paper in question was not read at the meeting, and I never knew of its existence until I read it in the published reports, I accordingly promised that I would look into the matter; but on carefully reading again Mr. Rutter's lengthy article, I must confess that I am at a loss to make out what he is driving at. Though it is very evident, from the tone of his remarks, that he intends to be very severe on me, I fail to see in what my offense consists, and shall have to ask for a bill of particulars before attempting to make a formal reply; and shall, therefore, be very brief in what I have to say at present concerning the paper in question.

From what I can gather from Mr. Rutter's vague remarks, it seems that one offense I am charged with is not subscribing, unconditionally, to somebody's fungus theory about yellows. In regard to that charge, I will only say that I have never held or expressed an opinion differing from the following, which I take from Mr. Rutter's remarks on this subject: "The yellows is a specific disease affecting the peach, and the cause assigned, and pretty generally now conceded, is a parasitic fungus." I have not been able to find anything I am reported to have said differing from this, and if there is any, I must have been wrongfully reported. It is true, I have, perhaps, intimated that I did not yet consider it settled with mathematical certainty that the fungus always found in diseased peach trees was the cause or the effect of the disease, and all that I can say on that point is, if that be treason, you will have to make the most of it.

Mr. Rutter also seems to take exceptions to some questions which he repeatedly characterizes as "captious," which I thought proper to propose in a paper prepared by me, and published among the reports of 1882. In looking over this paper, with all the light I have since been able to obtain, I feel constrained to say, that I am unable to see wherein the queries taken exception to are otherwise than pertinent and proper; and I cannot forbear saying now, that I think it would have been much more to the purpose if Mr. Rutter, instead of making so many inuendos in his long-winded article, had taken up these questions and answered them. To say anything more on this subject would make it necessary to quote a large part of the article in question, which would be manifestly improper, as any one who may desire to pursue this subject further can refer to the reports.

One more point I find in Mr. Rutter's article definite enough to reply to. After quoting from me as saying that I had doubts about the roots, in this disease, being affected to any great extent, he then claims to have found that I have contradicted myself in this, by advising at some time against planting peach trees on the site of an old peach orchard, as they would be more liable to take the yellows; and he triumphantly exclaims: "How could they take the yellows except from the root?" Now, I would not follow Mr. Rutter's example by pronouncing this question as "captious" and dismissing it, my object being to find out truth and not to find fault with what others may think. Mr. Rutter asks: "How can peach trees planted on the site of an old peach orchard take the yellows except from the root?" To this I answer: First, that having no theory of my own about yellows, I have never pretended to tell how the disease is communicated from tree to tree. This is just what I have been trying all my life to find out, but can't get Mr. Rutter, who seems to know all about it, to tell me. When I ask him, his only answer is that "my question is captious," and that don't make me any the wiser. If I was asked how yellow fever, or how pleuro-pneumonia or hog cholera, or any of the many other contagious diseases to which man and other animals are liable, is communicated from one subject to another, or how the specific miasmatic poison which causes ague, for instance, is communicated to the patient, I would have to answer, as I do with peach yellows, that I do not know. There may be experts that know all about these things, but I have not got that far yet. I can, however, imagine how a peach tree could get the yellows otherwise than from the roots in an atmosphere impregnated with the germs of the disease, as that of an old peach orchard might be supposed to be, just as easily as a person might take the small-pox or yellow fever from living in a house where others had died of the disease, or cattle take pleuro-pneumonia from being housed where the disease had been months or years before. Let us suppose the fungi theory to be the true one in yellows, and that the disease is communicated through the foliage or blossoms or young growth, as seems probable. I find, in reading a little further on in Mr. Rutter's article, he tells us the reason why a plum tree with peach roots never gets the yellows is, "there being in the plum no yellows, there is no spawn to be washed down by the rains from the limbs or body of the tree to the roots." Now, it occurs to me that the ground, being impregnated with this spawn washed down from the rains, as well as from the diseased leaves and twigs from the trees, might impregnate the atmosphere of an old orchard and communicate the disease to trees planted there as easily as an infected house or stable could communicate a contagious disease, or as easily as a diseased peach tree a mile off could do it.

As there seems to be nothing else in Mr. Rutter's long article that I can see specific enough to discuss, I shall dismiss it for the present. I am very sorry to have to say that I know of nothing new, either as relates to the cause or the remedy for the peach yellows. As lime is a well-known valuable disinfectant, I should have great faith in its use, as Mr. Rutter recommends, except that, according to my experience, it would require a quantity sufficient to destroy the germs of the yellows that it would also destroy the trees, as well as all other vegetation.

Though the question has so often been asked before, and I suppose I will be set down as "captious" for asking it again, I cannot forbear repeating that it is something very remarkable that the "peach yellows" is never found below a certain latitude, or perhaps an isothermal line, and it seems hard to dismiss the idea that there is not something climatic about it. I have often thought that further investigation in this direction might be worth pursuing. There can be no doubt that the opportunities for spreading the disease there are unlimited, millions of diseased trees having, no doubt, been sent there, and it does certainly seem a little difficult to reconcile the fungus theory with these well known facts. It occurs to me that the agricultural department of the Government, if it has not already been done, might here perform a valuable service by experimenting in this direction. For instance, let the question be settled by experiment, just how far the disease will go, and whether yellows can be communicated by inoculation or otherwise, or will develop under any conditions within the region supposed to be exempt. By pursuing these experiments, perhaps some more definite knowledge might be obtained than we are now in possession of. This being a question of such great importance, it has always been a matter of surprise to me that investigation in this direction has not been pushed to a greater extent than it seems to have been. But it may be that I am not booked up in this particular, as I must confess to a want of diligence in keeping myself posted in such matters of late, and my principal motive in introducing the subject now was not to attempt to throw any new light upon it myself, but in the hope that others might be able to do so.

In regard to Mr. Shearer's paper, it is very interesting and valuable, and he has had a great deal of practical experience, but he has made a great mistake in his theory as to the cause of yellows. I *do* know that it is not caused by exhaustion or starvation of the soil. I have planted in virgin soil, and trees took "yellows" before they bore a crop. I don't think Mr. Shearer's essay ought to go out without a protest against his position on this question.

Mr. Engle. I agree with Mr. Satterthwait that exhaustion or starvation is not the cause of yellows, but I believe that trees in an exhausted condition are probably more liable to take the disease.

Mr. Satterthwait. I manure very highly, and give good cultivation. At three or four years of age, my trees are big enough to bear a great deal of fruit. It has come to this: that peaches with me would pay better than any other fruit were it not for the yellows. Another important question is, how is it communicated from tree to tree? Is it communicated at any other time than when trees are growing or in leaf? Can it be communicated by the roots? These are important questions that I would like to have answered satisfactorily. I have peach trees now a foot in diameter that must be moved. They are in a strawberry bed, and if, as some claim, every root must be dug out and burned, I will be obliged to dig up fifty feet, at least.

Judge **STITZEL**. This question was discussed at our Gettysburg meeting several years ago. Rev. Sherfy's opinion was that the disease was carried from tree to tree by the pollen when in bloom. He noticed that it usually traveled over his orchards in the direction of the prevailing winds, from south-west to north-east. Others thought it was carried by bees, and that even with the pruning-knife there was danger of carrying the disease from tree to tree. There is great difference of opinion on this subject, and it is really the one serious drawback to successful peach-culture.

Col. **MCFARLAND**. This is an important question deserving further investigation, and I beg leave to offer the following:

Resolved, That a committee of three be appointed, of which Mr. Satterthwait be chairman, upon the subject of peach yellows, with instructions to communicate with the departments at Harrisburg and Washington, and, if possible, to secure experiments upon the subject, and report in writing at our next meeting.

Mr. **PARSONS**. I hope that the proposed committee will suggest that experiments will be made with special manures.

The resolution was adopted as read, and the following committee appointed:

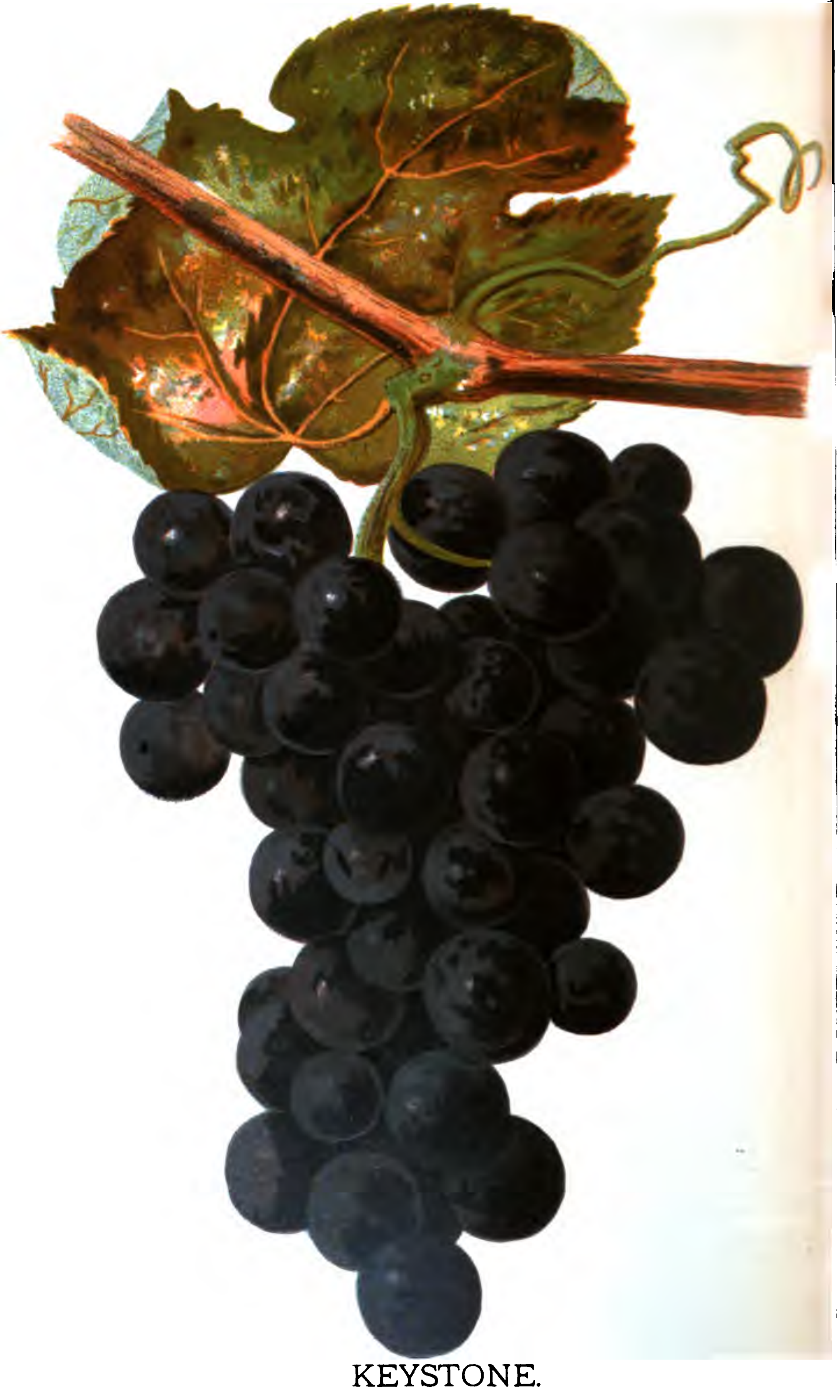
E. Satterthwait, Jenkintown, chairman; Colonel McFarland, Harrisburg, and S. B. Parsons, Flushing, New York.

Mr. **DAVIS**. I am waiting for some one to name a remedy. In Juniata county, we have not yet had much trouble with yellows. If yellow leaves and a number of thin sickly shoots are symptoms of the disease, we have symptoms at least.

Mr. **SATTERTHWAIT**. I hope none of our members will think that my trees are attacked by "borers" instead of yellows. We must not lose sight of the fact that yellows is a specific disease just as yellow fever or smallpox. Now the question is, is the disease the cause or effect? All the remedies we hear of don't amount to anything, unless we know that trees actually have yellows. The only sure remedy is to remove the tree.

Mr. **FOX**. Mr. Shearer is known to be one of the most successful and practical-fruit growers in this county. His orchards and success speak for themselves, and he deserves a respectful hearing. I hope the committee just appointed will try to learn all the facts bearing on this subject.

Mr. **ENGLE**. We all know that yellows is a fatal disease in the peach, and although a committee has been appointed to report upon this subject, this should not deter us from making observations. Prof. Cook has concluded that pear blight is always communicated at the ends of the branches. May not yellows be communicated in the same way? I am now making an experiment that I am watching with considerable interest. It has been claimed that peach or plum stocks will not take yellows. "Blackman" is a variety of plum that very much resembles the peach in foliage, wood, and manner of growth. Two years



KEYSTONE.

Originated in 1874, near Mount Joy, Lancaster county, Pennsylvania, in the garden of John Kready, and supposed to be a seedling of Concord. Vine healthy and vigorous, holding its foliage until fruit is fully ripe. Bunches generally shouldered and very compact. Fruit of good quality, and a remarkable keeper, having been kept in an ordinary cellar until middle of March. Season a few days earlier than Concord.

[illegible] bud from a [illegible] tree [illegible]

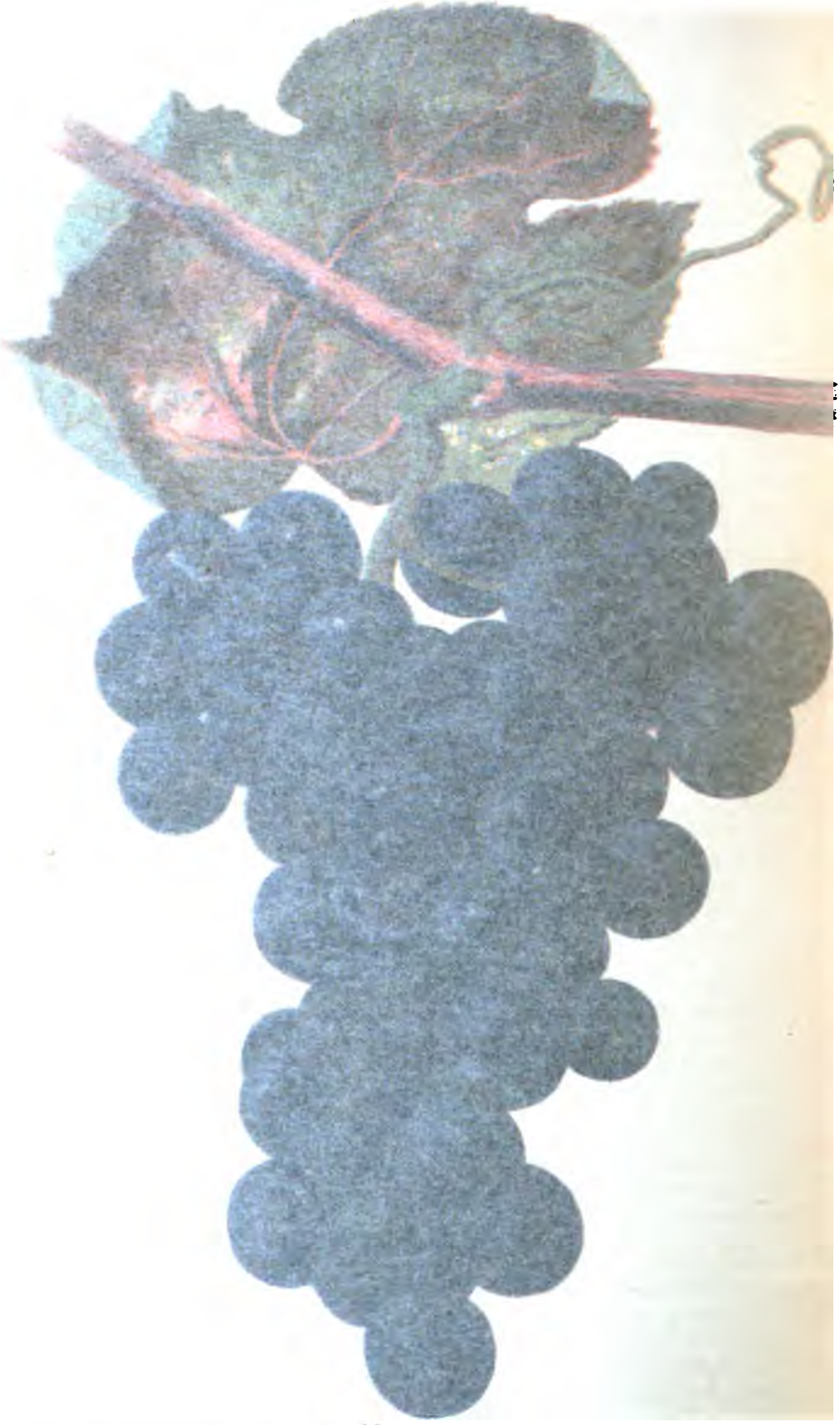
[illegible]

[illegible]

[illegible] the same [illegible] drain, with [illegible]

[illegible]

[illegible] reduced prices and [illegible]



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ago I took a bud from a peach tree having yellows, and placed it on Blackman plum. Up to this time, neither the original bud nor the tree upon which it is growing have shown any sign of disease. I will pursue the experiment still further and report results, and will be pleased to have others experiment also.

Colonel McFARLAND, chairman, read the following

Report of Committee on Orcharding.

To the officers and members of the State Horticultural Association of Pennsylvania:

GENTLEMEN: Leaving to the General Fruit Committee the collecting and tabulating of such facts as the experience of the past year has developed, your committee propose to deduce from the experience of many years such conclusions as seem to be well established. Without promising lengthy discussions of any of these conclusions, your attention is invited to them in the hope of promoting closer study and more intelligent action.

Your committee see no good reason why Pennsylvania should stand so low in the sisterhood of States in the quantity and quality of her fruits; at least, no reason that may not be removed. Fruit-growing can be successfully followed in every section, perhaps in every county, of the State. On the thin hillsides of Adams, York, Juniata, Perry, and other counties, peach trees grow well, bear heavy crops of excellent fruit, with no more failure than grain crops have, and live a reasonable number of years. Last fall, while traveling through Blair and Cambria counties, the writer noticed that every apple tree planted on the slopes of the spurs and foot-hills of the Alleghenies, (south-east side,) was loaded with fruit of good size, fine appearance, and good flavor for the varieties; and he was told that the same was true the previous year, and generally every year. Here, the soil is mainly disintegrated rock or clay loam, with porous sub-soil of gravel or slate.

Pear trees, twenty years or more planted, seldom fail to bear regular crops in most localities, and are frequently found vigorous and productive when fifty or sixty years old. Plums and cherries do well in favorable localities, and quinces in most places. Even apricots and nectarines are sometimes successful. A grapery in Dauphin county, situated on a clay-gravel hill, gently sloping to the north-east, has not failed once in sixteen years, the smallest crop yielding one hundred dollars, and the largest, six hundred dollars per acre. Another within two miles, on sandy river bottom, has regularly failed.

These are only illustrations taken at random. Every county in the State, and, perhaps, every township, has its favorable localities, where fruits of most kinds can be profitably grown for home use or market. The broken, rolling character of the surface of the State furnishes well-drained slopes with suitable sub-soil and exposure in nearly every township for profitably growing some variety of fruit for market; while pears, quinces, grapes, and crab-apples will grow and produce about every farm-house as often as farm crops, and with about the same amount of care. Small fruits are even more certain and much more profitable. Small farmers and market gardeners in the vicinity of villages and towns will find the culture of berries more profitable than anything else, particularly since early produce from the South has so seriously reduced prices and demand for early vegetables.

The foregoing facts cannot be successfully denied, and could be largely multiplied. Why, then, you will ask, do not our people cultivate fruit more largely, and why are failures so numerous? The reasons are just as evident. Your attention is now invited to some of the causes of failure.

Causes of Failure.

1. *Location of Orchards.*—Too little attention is paid to locating orchards. Most farmers plant the field that suits their buildings, or that happens to be ready for planting when they take a notion to plant. Ignorant of the soil, drainage, and exposure necessary to insure success for any one kind of fruit, they frequently plant many kinds in fields totally unsuitable for fruit of any kind; and yet, as we have seen, suitable locations are to be found in every county in the State.

2. *Varieties to Plant.*—Here, again, the farmer errs. Knowing little or nothing of fruit-culture, he knows less, if possible, of the varieties now cultivated likely to suit his soil, climate, and market. He is a victim of the too often dishonest and heartless, as well as ignorant, tree agent, whose interest goes no further than the getting of a profitable order. Too often untried varieties of trees and vines are ordered from overwrought plate books and sample cases, most of which are destined to fail in good locations with skillful culture, and yield nothing but disappointment to the nine tenths of common planters. The writer has often seen, as has most of his hearers, no doubt, as many varieties as trees planted, half or more entirely unsuitable for unskilled culture.

3. *Culture.*—Even when orchards are well located and set with good varieties, failures are numerous, both for want of culture and because of unskilled culture. The general farmer has little idea, and as little taste for fruit-culture. He will pass fruit trees about his buildings every day during the year, and never think of spending five minutes in removing borers or caterpillers, or of giving them any other needed assistance in their struggle for life; but he will promptly growl if those trees fail to furnish him large crops of luscious fruits every year, ready for table and market. The writer sold a thrifty neighboring farmer five hundred grape-vines, which grew finely. But several years after, the farmer came to ask why his grapes would not ripen. Upon going to see them, it was found that the farmer had planted two rows of potatoes between each row of grapes. These he had carefully cultivated, not allowing a weed to disturb them; but his grapes were untouched, and were doing the best to grow and bear in a stiff two-year sod. They had done more than their duty in growing at all and partly maturing a crop. But it never entered the farmer's head that he should help them, and that they would yield him five times as much for his labor as his potatoes could if he gave them the same cultivation. And this farmer is a fair illustration of farmers in general.

4. *Handling, Preserving, and Marketing.*—Time will only permit the naming of three causes of failure; and they need only be named to those familiar with the subject to receive hearty indorsement as very important causes of failure in making fruit-culture pay. It will be admitted by all that fruit will bring more or less in market in proportion as it is carefully picked, sorted, and packed, kept in good condition past the glutted period, and then properly marketed.

The Remedy.

I. Skilled Culture.—The remedy is undoubtedly the locating, selecting, planting, and culture of fruit trees by skilled persons. It is claiming no more for fruit-culture than is granted to every other branch of business, that it can be successfully conducted only by those who have served an apprenticeship and profited by the teachings and experience of others. Daily illustrations prove the truth of this position. Persons take some favorite variety of fruit, plant it carefully in suitable location and soil, apply the proper fertilizers in abundance, cultivate with skill, pruning, thinning, and protecting properly and at the right time, and get wonderful results—often claiming to have originated a new variety, when it is only a well-grown specimen of a variety which fails oftener than it succeeds elsewhere for want of the skill and attention thus received. It needs no argument to prove that skillful treatment not only brings good crops of fruit, but actually improves varieties, just as similar treatment improves the breed of horses, cattle, sheep, and hogs. And it is just as true that ignorance and neglect cause not only failure, but actual deterioration both of fruit and stock.

We assert, therefore, without fear of successful contradiction, that until the same rules that bring success in other vocations of life are applied to fruit-culture, failures must continue to be the rule and success the exception. Nor do we believe that gathering and tabulating isolated successes serve our good purpose, unless it be to further illustrate the well established fact that success in this business is secured just as it is in all others, by the intelligent employment of skilled labor.

II. Instruct the Planter.—The wider information upon successful fruit-culture is disseminated, the more rapidly the general planter will improve in his practices and become more successful. Pennsylvania farmers are proverbially slow at taking up with new ideas and must be handled carefully—particularly is this the case in fruit matters. They have been so often and so badly imposed on in the purchase of stock from irresponsible tree-peddlers that they look with distrust upon those who approach them on the subject. But a few years of honest dealings with them will remedy this. If nurserymen would unite in protecting them as much as possible from imposition, and would send with each invoice of trees printed leaflets with instructions how to handle, plant, and care for trees, and invite further correspondence, they would make an important step in the right direction. The distribution of journals devoted to the subject will also aid; and nothing teaches more efficiently than the success of neighboring fruit-growers. The successful establishment of a nursery at Rochester, New York, attracted another and another and another, until it now contains scores of successful establishments, and the nursery business has become one of its most profitable industries. The starting of a fruit orchard in Juniata county by a Philadelphia merchant directed attention to the subject, and now there are tens of thousands of peach trees in successful bearing within the county, yielding a handsome living to many. Thus it always is.

But no matter how it is done, farmers and market gardeners must be reached and instructed, if we would have Pennsylvania take her proper position in the line of fruit-producing States. This Association is doing much, and should do more. Its proceedings and accumulation of valuable information should be scattered by the ten thousand. It should employ lecturers, and have a committee especially charged with the duties belonging to a bureau of information for those who need it. Ten years of persistent effort will do more to multiply successes and limit failures than an idle dependence upon Providence or chance ever will.

But we must close. We will do so by giving the following as truisms:

1. Orchards well selected, planted on partially protected slopes, on clay loam with porous, well-drained sub-soil, deeply plowed, sufficiently fertilized, properly cultivated and managed, will succeed as often as other farm crops will.

2. Orchards selected and located at random by ignorant planters, and cultivated and managed as most orchards are, will uniformly fail.

3. Selecting varieties that succeed and rejecting others that fail, under the usual haphazard treatment, is unreliable as a guide, and does injustice to the varieties rejected.

4. The apples, cherries, and pears, cultivate until the trees come into bearing; then leave lie in grass, top-dressing when needed with ashes, lime, manure, &c., washing down at least once a year with soap-suds or some equally good substitute—June preferred, so that insect eggs and young borers may be destroyed—and examined in October or November for borers.

5. It is, perhaps, an open question how much peach orchards should be cultivated and trimmed after they come into full bearing. Vineyards must be kept clean, but may be injured by deep cultivation. Small fruits and berries must be well cultivated and fertilized to secure success.

Respectfully submitted.

GEO. F. MCFARLAND, *Chairman*,
HENRY C. SNAVELY,
JOS. W. THOMAS.

Mr. DAVIS. I wish to correct one error in the report just read. The "Philadelphia merchant" is not entitled to the credit of having been the pioneer in the peach business in Juniata county. The Smith Brothers are the pioneers, and to them belongs the credit.

Mr. ENGLE. It is about time for adjournment, but before so doing I move the selection of a place for the holding of our next annual meeting be considered the first business in order at our meeting this afternoon. Adopted.

Mr. HOOPES. Before adjournment, there is another matter we have almost overlooked. Mr. Parsons, who is about to leave us, has possibly no equal in this country as an authority on landscape gardening and horticultural adornment. I move a vote of thanks for his very interesting essay. Adopted.

Adjourned.

[Owing to want of room, the remainder of our report, consisting of the entire proceedings of our Thursday afternoon and evening sessions is omitted.

SECRETARY, S. H. A. OF PENN'A.]

REPORT

OF THE

Pennsylvania State Dairymen's Association, 1886.

LIST OF OFFICERS.

President.

Hon. M. W. **OLIVER**, Conneautville, Crawford county.

Executive Committee.

A. M. **FULLER**, 1st Vice President, Meadville, Crawford county.
WILLIS P. HAZARD, 2d Vice President, West Chester, Chester county.
Hon. J. C. Sibley, 3d Vice President, Franklin, Venango county.

Secretary.

R. H. **ODELL**, Meadville, Crawford county.

Treasurer.

W. W. **DEAN**, Meadville, Crawford county.

Vice Presidents.

Eastburn Reeder,	Bucks county.
J. Canfield,	Erie county.
G. W. Carroll,	Erie county.
A. R. Sturtevant,	Crawford county.
J. B. Phelps,	Crawford county.
Col. James Young,	[County not given.]
George Blight,	Philadelphia.
Joseph E. Gillingham,	Montgomery county.
I. P. Thomas,	Delaware county.
Henry Palmer,	[County not given.]
Hon. John Fuller,	Crawford county.
S. S. Spencer,	Warren county.
Edward Brinton,	Chester county.
John Cole,	Crawford county.
A. G. Moore,	[County not given.]
Col. P. B. Carpenter,	Crawford county.
S. R. Harper,	Crawford county.

CONSTITUTION

OF THE

PENNSYLVANIA STATE DAIRYMEN'S ASSOCIATION,

Adopted April 13, 1871, Amended January 18, 1882.

SECTION 1. This organization shall be known as the Pennsylvania State Dairymen's Association.

SECTION 2. Its purpose shall be to improve and develop the dairy resources of Pennsylvania.

SECTION 3. Its membership shall consist of such persons as shall pay into the treasury the requisite fees, and of honorary members. The fee for permanent membership shall be one dollar, and for annual membership fifty cents.

SECTION 4. Its officers shall consist of a President, Secretary, Treasurer, and twenty Vice Presidents.

SECTION 5. The Executive Committee shall be composed of the president, secretary, treasurer, together with the first three vice presidents, and shall have the oversight of the affairs of the Association, the appointment of its meetings, and all arrangements for the same, including the annual meeting for the election of officers.

SECTION 6. It shall be the duty of the Secretary to keep and prepare for publication the transactions of all meetings of the Association each current year, embracing such papers as shall be approved by him. The Treasurer shall keep the charge of the funds of the Association, and shall disburse the same on the order of the Secretary, countersigned by the President, and shall report receipts and disbursements at the annual meeting.

SECTION 7. Amendments to this constitution may be made at any annual meeting, by a two-thirds vote of the members present.

TWELFTH ANNUAL MEETING

OF THE

PENNSYLVANIA STATE DAIRYMEN'S ASSOCIATION,

Held at Meadville, Pa., February 9, 10, and 11, 1886.

The twelfth annual session of the Pennsylvania State Dairymen's Association convened in Library Hall, at Meadville, Pa., on Tuesday, P. M., February 9, 1886, with a good attendance of members and delegates. The meeting was called to order by President A. M. Fuller, who appointed as an auditing committee, Mr. L. C. Magaw and Mr. Seth R. Harper, and called for the reports of the Secretary and Treasurer.

SECRETARY'S REPORT.

MR. PRESIDENT AND GENTLEMEN OF THE ASSOCIATION: Your Secretary is unable to render such a report as he would like. It has been his first experience in the position, and this is the first meeting of the Association since his election. He can, therefore, impart to you very little history of work done by the organization. He hopes his successor may not be permitted to make a similar complaint at the end of another year, but that it may be his good fortune to report several meetings held, much good accomplished, and numerous additions made to the membership, which, at the present time, appears to include the names of about three hundred persons in different parts of the State. Although the majority of meetings held and work done in the past by the Association have been in this part of the State, the list shows Crawford county to have eighty-five life members, while Chester county has thirty-four, Bucks, thirty-three, Erie, twenty-two, Delaware, ten, Susquehanna, seven, Venango, three, Mercer, Montgomery, and Philadelphia, two each, New York State, five, the remainder scattered in other counties of this State and in other States. The fact that the membership is not greater in this part of the State may be accounted for from the fact that in the earlier years of the Association the membership was mainly annual, and since the adoption of the life membership rule, other counties, whose membership compares favorably, have had meetings of the Association, and have, therefore, had about as good opportunities of acquiring membership as has Crawford, in proportion to the members gained.

There is a possibility that the names of members are not all on the list who are entitled to be there. Some I have found having life membership cards whose names were not enrolled. It might not be unwise to make an effort to perfect the enrollment of names. I trust that the names of more than a hundred farmers of Crawford and adjoining counties will be enrolled ere this meeting adjourns.

It is not necessary that your Secretary enter into a discussion of the condition of the dairy industry of the State, or any part thereof. That feature will be fully covered in discussions by abler minds farther on in the meeting, and I forego the pleasure of boring you with statistics and estimates upon that subject. Considering the magnitude of the industry for the benefit of which the efforts of this Association are made, the work accomplished by the Association is very far short of what it should be, yet it does about all it can with the means at its command. The State's donation, or appropriation, of the niggardly sum of a few hundred dollars to the support of an organization whose every effort is in the interest of that great class upon whose prosperity the perpetuity of the country, the welfare of the State, and the success of every other industry depends, while it contributes thousands and tens of thousands to institutions of doubtful merit, and, alas, too often savoring strongly of being largely private in character, and fostered and perpetuated largely for the accomplishment of personal ends desired by those under whose charge they are, may well be characterized as bearing a very close relationship to an outrage upon a great body of its citizens, who are engaged in a most worthy and laudable enterprise.

This Association should be so provided for as to be able to accomplish much good for the farmers and dairymen of this State. It should be enabled to hold at least four meetings annually, in as many different parts of the State, and it might, with great profit to the people, hold double that number during every winter season. It should be enabled to walk hand-in-hand with the State Board of Agriculture in the work before it, and the State Board is illiberally supplied with means. It is unable to practically cover but a very limited portion of the State; in fact, could not cover it all were it enabled to hold a meeting every week in the year.

This is a large State. It affords opportunity for the best efforts of many more such organizations than it possesses. The State Board seldom holds a meeting west of the Allegheny mountains, in fact, it cannot well get far from its head-quarters with the means at its command. Hence this Association should be so provided for that it could hold frequent meetings in the west part of the State, while the State Board looks after the east, each carrying its full portion of benefit to the practical dairy and agricultural interests of the State. With the accomplishment of that purpose in view, I trust this Association, ere the present meeting adjourns, will adopt measures looking to its better provision for accomplishing the work it should and would accomplish were it properly equipped. Gentlemen, farmers of Pennsylvania, I trust there is a bit of thought-seed in this suggestion which will take root in your cultured minds, grow and produce fruit.

Respectfully submitted.

R. H. ODELL,
Secretary.

TREASURER'S REPORT.

J. H. LENHART, *Treasurer, in account with Pennsylvania State Dairymen's Association:*

1885.			*Dr.*	
Feb.	2.	To balance,	$525 73	
	10.	To membership fees,	14 00	
July	1.	To membership fees,	1 00	
Dec.	24.	To State warrant,	350 00	
				$890 73

1885.			*Cr.*
Feb. 4.	By M. C. Beebe,	$10 00	
	By S. H. Thompson,	50 00	
	By W. H. Jordan,	27 50	
	By H. C. Green,	20 00	
	By W. J. Chamberlin,	50 00	
	By F. M. Braymer,	5 00	
10.	By A. M. Fuller,	34 23	
11.	By E. A. Hempstead, balance on account,	18 00	
	By Tribune Publishing Company,	2 00	
19.	By W. P. Hazen,	46 63	
20.	By R. H. Odell,	11 80	
26.	By freight on report,	6 58	
March 6.	By Meadville report,	7 60	
18.	By W. M. Wallace,	25 00	
June 15.	By A. M. Fuller,	1 87	
Sept. 11.	By A. M. Fuller, freight,	62	
Dec. 19.	By R. H. Odell,	6 00	
29.	By R. H. Odell,	6 65	
1886.			
Jan. 23.	By J. W. H. Reisinger,	3 60	
30.	By J. E. & W. A. Rupert,	2 00	
Feb. 2.	By J. H. Lenhart, postage,	2 36	
			$337 44
8.	**By balance,**		553 29
			$890 73

Audited and found correct.

L. C. MAGAW,
S. R. HARPER.

PRESIDENT FULLER'S ANNUAL ADDRESS.

MEMBERS OF THE ASSOCIATION, GENTLEMEN: We are again met in annual convention, and as we compare notes and consider the present condition of the dairy interest, and the experience of the past twelve months, we may be led to conclude that the year which is past has been somewhat discouraging in its results to the dairy interest.

We can console ourselves in the thought that our business has not suffered more severely than other branches of industry. The commercial depression which has rested upon all kinds of business, and which has been world-wide in its influence, has not more seriously affected the dairy interest than it has that of wheat-growing in the West, and all other branches of farming.

When wheat, corn, pork, beef, and other farm products are low in price, it is only reasonable to expect that cheese and butter will suffer depression from the same causes which affect these commodities.

Frequently in the past, dairy products have been relatively high in price as compared with all other farm products. The past year has proved an exception, and unsatisfactory prices for butter and cheese have ruled throughout the year. While it might seem profitable to search after the cause of the depression which is now resting on the dairy business, as well as business generally, I think few of us would have the temerity to undertake the task. That the depression in dairy products is caused in part by the extensive manufacture of imitation butter and cheese, no one will deny. This, however, will not account wholly for the depressed state of the trade.

I have no desire to speak discouragingly of the future. It would be far more agreeable to prophesy better things. I cannot, however, as yet see the silver lining in the cloud which seems to over-shadow all business enterprises. We may rest assured that the era of good times will some day come, and with it prosperous times for the dairy business. There is nothing specially discouraging in the fact that the dairy business is not at the present time, and is not likely to be highly profitable in the immediate future.

The principles which govern business of all kinds apply equally to it. I would take the risk of finding it as profitable in the end as any other branch of farming. We should seek to render the business more profitable by improving our farms, stock, and facilities for conducting the business, and carefully consider all the advantages which recent investigation and experience is providing whereby greater profit can be secured.

You may suggest that farming is unlike other lines of business in that it is capable of being shifted into different channels. It may be devoted to stock-raising, sheep-husbandry, or dairying, as either one or the other may seem to promise the greatest return. I admit that changes are more easily made, and with better results, in farming than in other lines of business.

We seldom see the druggist become a successful hardware merchant, or the dry-goods merchant become a successful druggist. Still I maintain that the same rules that govern other business will hold good in a large business in farming operations, and especially in dairying. We have not yet reached the top round of the ladder in dairying. We have much to learn regarding it, and I know of no branch of business more worthy of our earnest effort and thought. The great demand at the present time in farming is for more intelligent study and the adoption of the best methods.

It is not the shifting policy, the change from one branch of farming to another, that will insure greater profit, but more perseverance in and the mastery of the particular branch of farming in which we may severally be engaged that promises success in the future. We are living in a time that calls for thorough education and equipment in any branch of business in which we may engage.

The demand for specialists was never greater than it is to-day. To succeed in coming time, a man must be carefully and thoroughly educated in his special calling, and even then, owing to the swiftly changing current of events, he is liable to failure.

Thirty years ago, the young man who served an apprenticeship at the cobbler's trade, believing that it would afford him a lifelong means of subsistence, finds to-day that his occupation is gone. Machinery has revolutionized the trade, and the cobbler finds little to do but patching and mending.

The coal operators in Pittsburgh little thought, twelve months ago, that their trade and occupation was any less substantial than the hills in which they worked. Natural gas, however, has come to supplant it. The dairyman will no doubt add that he little thought when some ten years ago he embarked in the dairy business that oleomargarine would so soon come to damage his business and curtail his profits. These few instances which I have enumerated prove the necessity of keeping fully abreast of the times by giving thought to the requirements of business, and adapting it, so far as we are able, to the constantly varying circumstances we are called upon to meet.

Dairying, I believe to be one of the most profitable branches of farming in which we can engage. We must, however, make it a study, adapt it to the changes that are constantly taking place in the market, and endeavor, if possible, to render it still more profitable.

We are met on this occasion for the express purpose of gaining some new knowledge on the subject. We should aim to profit by the experience of our able speakers from other sections, and by the interchange of opinions among ourselves.

We should be able, in a measure, to determine whether it would not be more profitable in the future to adopt the creamery system in this part of the State, as practiced in other sections, and raise more stock in connection with dairying. I feel that the time has come for a careful consideration of these matters. It is essential to success in dairying that we inquire into the requirements of the market. It will not answer to follow blindly in the old ruts. Ten years have wrought many changes in the dairy business. Canada has come forward with an immense product of butter and cheese. The West is, in a measure, introducing mixed farming, and producing a large amount of butter and cheese. Oleomargarine is still defiant, and a strong competitor in the butter market. I consider, however, that Pennsylvania, with the great Eastern markets so near at hand, ought to be able to compete successfully with other sections.

Without further discussion of this interesting subject, I invite you all to lend your ablest assistance in solving these important questions. Your Executive Committee have spared no effort to provide able speakers and interesting topics for this occasion. We invite you one and all to take an active part in the proceedings.

President **Fuller** then introduced Hon. J. C. Sibley, of Franklin, Pa., who spoke as follows upon

THE JERSEY, THE FAMILY AND DAIRY COW.

Neither my education nor calling in life is such as to qualify me to make you an address that will tickle the ear or please the fancy. There are those among my fellow Jersey breeders who are not only successful as breeders, but charming speakers as well; and I regret that you might not have the pleasure of listening to such a one to-day. However, my subject is one that enlists my whole heart, and I shall speak as well as I know how.

While my subject is, "The Jersey, the Family and Dairy Cow," allow me to speak briefly upon the magnitude of the dairy interests of the United States. The Encyclopedia Britannica places the number of milch cows in the United States at fifteen million, and further states in defining a good dairy cow, as follows: "A good milch cow should yield, in a milk-giving period of from eight to nine months, about five hundred gallons of milk." Taking the above as a basis of calculation, and allowing a gallon of milk to weigh eight pounds, or a yearly yield of four thousand pounds to each cow, we find the aggregate to be no less an amount than sixty billion pounds, or thirty million tons. If we take ten tons as a car-load, it would require three million cars to transport the yearly milk product. Allowing the cars, as coupled, to cover a space of thirty feet each, we find that it would make a line of freight cars over seventeen thousand and forty-five miles long; or if the four tracks of the New York Central and Hudson River railroad were extended through to the Pacific coast, all four tracks would be solidly filled, and enough cars would remain to fill a double-track road from St. Paul to New Orleans, and enough more left over to fill a single-track road from Chicago to the City of Mexico. If sold at an average price of one and one fourth cents per pound, or two and one half cents per quart, it would amount to the enormous sum of seven hundred and fifty million dollars.

Such illustrations help the mind to conceive, to some extent, the immensity of the interest you represent here to-day, as the officials and members of this Association. It is seldom that people stop to consider, and few really know anything of the volume of the dairy or agricultural interests of the country. We, of the oil regions of the State of Pennsylvania, justly consider how important the production of petroleum has been to the commerce and wealth of the State. Yet the total value of all the petroleum produced in the State since the striking of the first well to the present time, does not equal the combined agricultural products of the States of New York and Pennsylvania for a single year.

One hopeful sign of the times to the agriculturist and dairyman is such a gathering as this one. Here we can work together 'to draw Truth from the bottom of the well, where she is said to lie hidden, and by the interchange of thought, the gentle friction of one's ideas and experiences with another's, we shall do much toward perfecting and polishing the setting which encircles the precious gem.

Another and most hopeful sign is the agricultural press of to-day. The one hundred and upward of agricultural papers published, most of them of high order of merit, and presumably financially successful, are indicative of the fact that the American farmer of the present is keeping posted on what pertains to his vocation. Some one asked one of the old master artists with what he mixed his colors to produce such grand effects. "I mix them with my brain," came the ready response. The farmer of to-day is not necessarily any longer a mere drudge. He is mixing the labors of his hands and his brain. Some great statesman, years ago, spoke of the grand future of this country because the school-master was abroad in the land. The agricultural press, the great educator, is abroad in the land, and he who neglects the advantages to be derived from reading some one of these papers, will do so, not alone at an intellectual loss, but a pecuniary loss as well. As reasonably may the would-be statesman refuse to read history; the lawyer, Blackstone and Chitty; the politician, current politics, as the farmer the latest achievements, the record of the successes and failures of his brethren. Experience is a dear school, and he who can profit by the experience of another is the truly wise man. I do not say for you to believe all you read in the agricultural papers, but I do say that he who cannot, by taking two or three of the leading papers of the country, get out of their columns, in dollars and cents, ten times their cost, is the man who is blind either in his eyes or his understanding. As I have before remarked in public, the time has gone by when the fool of the family is made the farmer. He is now reserved to be the speculator and the politician. The farmer who would succeed must keep step with the music, and near the van of the procession.

There has come into the mind of the Eastern farmer, owning high-priced lands, the question how to compete with the cheap and fertile lands of the great West. Clearly, he cannot compete in their specialties, and, therefore, must school himself to the new order of things. He must make one acre of land produce double what it did before. He cannot grow beef as cheaply as it can be done upon the great grass ranges and the fertile cornfields of the West, but he can produce an animal which will give him twice the quantity of milk, butter, and cheese that the scrub cow has been yielding for him. Thousands of carefully-conducted experiments, always with similar results, covering a period of over a third of a century in this country, clearly prove that the Jersey cow can perform this self-same task of doubling the products of the dairy. This is a matter of vital importance to all thoughtful and prudent farmers, and I trust will command your attention while I go into it in detail.

The early history of the Jersey breed is obscure. From their delicate shadings, large and mild eyes, and fawn-like appearance, arose no doubt the tradition, which is still cherished on the Island of Jersey, that the breed originated through a union of the cow and the deer. It at least remains as their history that over one thousand years ago, their peculiar qualities were such as to excite among writers the presumption that they originally came from Normandy, as many of the characteristics of the breed are observable in the cattle of Normandy and Brittany. The difference existing to-day is doubtless owing to the difference in climate, care, and surroundings. It may be of interest to some if I give a slight history of the home of these cattle. The principal Channel Islands are four: Jersey, Guernsey, Alderney, and Sark. They have been part of the possessions of England since the days of William the Conqueror. They are in the English Channel, sixteen miles from the coast of France.

These islands, washed as they are by the Gulf stream, possess, perhaps, the finest climate in the world, with the fruits of the tropics and the far north. The Island of Jersey, the largest of the Channel Islands, is but seven miles wide by eleven miles long. The total amount of tillable land is but twenty-five thousand acres, and the population, sixty thousand, or upward of two persons to each acre of land, and one cow to each one and one half acres of land. This may seem like close farming; nevertheless, these islands produce sufficient for their own needs, and these people, per capita, are the richest agricultural community in the world. Necessarily, the cultivation of this land must be of the highest order, and the available product of each foot of land carefully considered. Within the limits of this address it will be impossible to state the methods of rotation and tillage. Such as are interested, I would refer to the Encyclopedia Britannica, or to an admirable essay by Col. George E. Waring, published by the A. J. C. C. Suffice to say that the rich and succulent forage, long continued, has been no doubt a great factor in the development of this marvelous butter breed. Another aid in the development of this distinct species is that of inbreeding. For generations, so highly has the Jersey man prized his cow, that their most ancient laws enact the most severe punishment for the importation of any cattle to these islands, even a ship for landing such animals being subject to confiscation. So much for the original home of this cow.

The history of the Jersey cow in America covers but a comparatively brief period, the first importation having been made in 1850. These animals were bought more for beauty than for any belief in their dairy capabilities; but one gentleman, Hon. Thomas Motley, was so impressed with the earnest protestations of the Islanders upon the richness of the breed that he was, in 1853, induced to set the milk of one of his cows separate for one year. The result was five hundred and eleven pounds of butter, considered in those days a marvelous yield, but since then over and over again greatly exceeded. The attention of the public was not called to these cattle to any extent until the formation of the A. J. C. C., in 1868. From that date until within the last six or seven years, the Jersey cow was still considered more in the nature of a luxury and an ornament for the rich, although remarkable butter tests were being from time to time reported. Some of these ran from fourteen to nineteen pounds in seven days, on grass alone; and some, on a moderate grain allowance, at the rate of twenty-eight pounds per week. Some few years since, Peter C. Kellogg, under the *nom de plume* of Hark Comstock, wrote several articles under the heading, "Look into the Churn." The result was that Jersey breeders commenced looking into the churn. The owner of Jersey Belle of Scituate looked into his churn, and found his cow gave twenty-five pounds three ounces of butter in seven days, and seven hundred and five pounds in a year. The owner of Eurotas looked into the churn, and found his cow gave twenty-two pounds in seven days, and seven hundred and seventy-eight pounds in a year, and dropped a living calf, the highest grain feed for any one day, during the whole year, having been eight quarts. The owner of Mary Anne of St. Lambert looked into his churn, and found that on pasture and five quarts of ground oats daily, his cow gave one hundred and six pounds in one month, and eight hundred and sixty pounds fourteen and three quarter ounces in eleven months and five days. She has since tested thirty-six pounds twelve and one quarter ounces in seven days. Ida of St. Lambert gave thirty pounds two and one half ounces in seven days, and Princess 2d, forty-six pounds twelve and one half ounces in seven days. Oxford Kate gave thirty-nine pounds twelve ounces in seven days. There have been separately tested something over fifteen hundred cows that have produced from fourteen pounds to forty-six pounds twelve and one half ounces in seven days; and right here allow me to state that all these greater tests have been officially conducted by committees appointed by the A. J. C. C., by agricultural societies, and by those, in many instances, who were loudest in their criticisms. The rules providing for the official test of cows are so stringent that there could be no deception, were the owners ever so anxious. I do not wish to be considered as boasting in referring to our own herd, for we recognize the fact that there are many herds equal in butter production, and I merely refer to it as showing the uniform butter-producing power of this breed. Last season, we set separately the milk of nineteen cows, and but two of the nineteen failed to give from two to four pounds of butter per day. These tests have been on moderate feed, not on the high-pressure plan of risking the life of the cow to make a great test. We wish to be distinctly understood. We have some poor cows in our herd, but we want it also to be understood that no man can pick out of our herd two cows (excepting only some very aged or injured animals, kept only for breeding) that cannot make over three hundred and sixty-five pounds of butter in one year. This statement is made in absolute confidence in its correctness, and we think it is under rather than overstated, and we doubt if there is a herd of average excellence that cannot do as much or more.

It is a matter of some extra trouble to set the milk of cows separately for long periods, and churn each by itself, but many of our cows, by tests for shorter periods, have indicated a capacity of over six hundred pounds of butter per year. We have one cow, Matilda 4th, that, for the present twelve months, we expect will make between nine hundred and one thousand pounds, without forcing. For the ten months ending February first, the lowest possible estimate on her production is eight hundred pounds one and one half ounces. Her milk was set by itself for periods of from one day to seven days, in May, June, July, September, and November. For all the time prior to October, each day was estimated at less than her lowest tested day. The months of October and November were estimated by the average obtained by a three days' test in the latter month. Her feed has been precisely the same, both in amount and kind, on the days when her milk was churned by itself, as when it was churned along with that of the other cows in the herd. For December and January her milk has been set for each day. The yield for January was seventy-three pounds one and one half ounces.

But it is urged against the Jersey cow that she is small, and of no value for beef. Allow me to repeat what I have stated on previous occasions, that as yet I have to find the owner of a Jersey cow who is desirous of converting her into beef. So long as she will breed, she is more valuable for other purposes. But let me be clearly understood in the following statement: that, give me a Jersey cow dry, if it be possible to dry her off, and I will make beef as cheaply and as quickly as with any other breed with which I am familiar, and that beef will be of as delicious a quality as man ever put into his mouth. We grew tired of hearing the claim that the Jersey cow was no use for beef, and gave it a practical test, worth at any time a ton of theory. We took a cow which was no longer a regular breeder, and on a feed of three hundred and fifty pounds of cornmeal increased her live weight two hundred pounds in eight weeks. Now that I have shown you the fact, I will give you the theory, which is this: The Jersey cow excels all others as a butter producer, because of her perfect organs of digestion and assimilation, which extract the fat from her food and deposit it as butter in her udder. That which in the ordinary breed is laid on the carcass, is in the Jersey put into the churn. When the Jersey cow is dry, you have to reduce her allowance, and use the greatest care that in the interval before calving she does not become too fat for safety in calving. That which she put into the churn when milking, she is, when dry, putting on her carcass. When a cow that makes nearly seven pounds of butter per day goes dry, she places that fat on her ribs, and I guess she does it as quickly and as cheaply, pound for pound, as any cow in the world. Pardon my digression, for I am not advocating the Jersey cow for a beef breed. The first cost is too high. The cow is worth more for other purposes, and the East, with high-priced lands, cannot compete with the plains of Kansas, Colorado, and Texas in the production of beef. And yet the average dairyman says he don't want the Jersey cow because she can't make beef. What does he want? He is not in the beef business. What would you think of the man who would say he would never buy a sulky hay-rake, but would stick to the wooden hand-rake, because when it was worn out it would make a good mop-handle?

But it is said that while the milk of the Jersey cow is rich, she gives but little in quantity. We will admit that there are some larger records in other breeds, but it must be borne in mind that very little attention has been paid hitherto to the amount of milk that Jerseys would give, the interest having been centered, principally, in the amount of butter that they would make. Nevertheless, we believe that Jerseys are far above the average, even in the amount of milk yield. The following are some of the yields in our herd: One cow has given sixty-seven pounds of milk per day, and averaged nearly sixty-six pounds of milk per day for a week. Another has given sixty pounds of milk per day, and averaged over fifty-seven pounds of milk per day for a week; another has given fifty-six pounds of milk per day, and averaged fifty-three pounds per day for a week. Many of our cows have given from forty to forty-eight pounds a day. All our milk is weighed just as soon as milked, and all the records kept of every cow. Here are some of the yields for long periods:

Cill of Glen Rouge, seven thousand and eight pounds in one year, with first calf, on ordinary dairy feed.

Goldstraw 3d, seven thousand and thirty-six and one half pounds in eight and one half months, on ordinary feed and care. Four and a half months in calf.

Nerissa of Nyack, seven thousand one hundred and thirty-six pounds in ten months, on ordinary feed. In calf, seven months.

Golden Zoe, as a ten-year-old, seven thousand two hundred and twenty-seven pounds in eleven months, on ordinary feed. In calf, seven months.

Silverstraw, seven thousand four hundred and sixty-one pounds in eleven months, on ordinary feed. In calf, eight months.

Mary of Pleasant View, seven thousand six hundred and fifty-five and one half pounds in ten months, on ordinary feed. In calf, seven months.

Butterfly, seven thousand eight hundred and six pounds in eleven months, on ordinary feed. In calf, ten months.

Duchess of Darlington, seven thousand nine hundred and thirty-six pounds in twelve months, on ordinary feed. In calf, ten and a half months.

Queensboro', eight thousand six hundred and twenty-two pounds in eleven months, on ordinary feed. In calf, eight months.

Fawn of St. Lambert, ten thousand one hundred and one and one half pounds with her first calf, in twelve months ending before three years old; had extra feed for the last four months only.

Matilda 4th, thirteen thousand seven hundred and eleven pounds in the ten months to February first, will probably yield over sixteen thousand pounds for the twelve months, without forcing.

La Petite Mere, 2d, ten thousand three hundred and twenty-nine pounds in one year, on ordinary feed. In calf, seven months of the year. For three months, to February first, she has aggregated four thousand six hundred and fifty-four pounds. With a little extra feed and attention, we believe this cow capable of yielding from seventeen thousand to eighteen thousand pounds during twelve months. I will promise you beforehand, too, that she will not be fed one drop of milk, or have any stimulant, tonic, or drug of any nature, for the purpose of creating an abnormal appetite or flow of milk. I do not wish to throw discredit on the performances of other breeds, but it is, nevertheless, current statement that the highest records in some breeds have been obtained by feeding milk in large quantities, and by abnormally stimulating the appetite. In the public prints time and again, Jersey breeders have called upon the owners of some of these great yielders to state what articles the animals were fed, and so far have not been favored with replies.

Ida of St. Lambert has given one thousand eight hundred and eighty-eight pounds of milk during thirty-one consecutive days in winter. This indicates to us that if she were to be cared for and fed as the representatives of some other breeds are alleged to have been, she could far surpass their highest reported yields.

However, as the Encyclopedia Britannica defines as a good dairy cow one that will give four thousand pounds of milk yearly, we think we have shown that the Jersey is not only a great butter cow, but a great milch cow as well. The Jersey cow is a persistent milker from one calf to another, and it is generally necessary to force her dry. Many we find it impossible to dry at all. The diminution in their flow of milk does not seem to imply a corresponding loss of butter. It is often found the case that a cow giving twelve quarts of milk per day is making more butter that when she was giving sixteen quarts per day.

But there are those who will tell us that if they were to feed their cattle of other breeds as highly as Jerseys are fed, they would make as much butter. Well, my friend, you try it and see. I predict that you will not have as much butter within a great many pounds, and you will probably have a dead cow if you feed one half as much as some of these Jerseys have eaten—one cow during an official test having been fed as high as fifty quarts of grain in a single day. The Jersey cow, with her perfect organs of assimilation and digestion, will take care of such a quantity of grain as would kill the average cow. High feeding to this extent is not to be commended. But many of the largest tests have been made on ordinary dairy feed. The high feeding only shows the powers of the cow to assimilate a vast amount of feed and convert it into butter-fat.

To return to the question of whether it is the breed or the feed which makes the butter cow, I beg to quote from Prof. Jordan's address to the State Dairymen's Association, February 12, 1885, when he stated in substance as follows: "That while the percentage of total solids in milk is greater with a rich ration than with a poor ration, on the other hand, the composition of those solids is little influenced by the amount and character of the food. If one fifth of the total solids in a cow's milk is fat when she is poorly fed, one fifth of the total solids will be fat when she is well fed. A cow that has the constitutional tendency to produce milk-solids having only one tenth fat, cannot, by any manner of feeding, be made to produce solids having one fifth fat. The total amount of solids in a given quantity of milk may, by rich feeding, be increased, but the proportion of fat to the total solids will remain the same. You cannot, by any manner of feeding, obtain Jersey milk from a Shorthorn cow." Such evidence as Prof. Jordan's is well worth your attention. It simply gives facts without bias as to breeds. It will never do to train Maud S. for a draught mare, nor a Clydesdale for a trotter. Each has its sphere of excellence, outside of which it is as worthless as the veriest scrub. He is a wise man who can accept accomplished facts. Suppose you were to say, your native horse can trot as fast as a Hambletonian, or some of the other families of horses that are recognized as carrying speed in their blood, and upon that theory you would commence training Pete and old Dolly. How long would it take you to breed a family of trotters from that strain? Why, my friend, you would lose the last nickel in the venture, and in the end your horse would not be able to trot fast enough to keep you ahead of the sheriff.

Again, recent investigations go to show that, for quantity and quality, the Jersey is preëminently the cheese cow. Prof. William Brown, of the Ontario Experimental Station, of Canada, conducted experiments with twelve different breeds, covering a space of seven months, and I have had the pleasure of reading his autograph report, which shows briefly as follows:

In the production of butter and cheese, the Jerseys led all other breeds.

The Jerseys made one and three fifth times as much butter, and one and one fifth times as much cheese as the Ayrshires, which was the second breed in merit.

The Jerseys made two and one fifth times as much butter, and one and one fourth times as much cheese, as the Holsteins.

Similar results were reached by the comparative tests for a single day, made at the fairs held at Toronto and London, last fall. The contest was to determine the best breed for milk, butter, and cheese combined. The trial again showed the Jerseys first, the Ayrshires second, Shorthorn grades third, and Holsteins ninth.

The number of pounds of milk required to make a pound of butter in these experiments was only fourteen for the Jerseys, while it was twenty-three for the Ayrshires, twenty-nine for the Shorthorn grades, and thirty-three for the Holsteins.

I am aware that these experiments have called forth much discussion, and some adverse criticism, and next season will show similar contests made at various agricultural experimental stations. I admit that for myself such a report was a great surprise, and I went to much trouble to assure myself of its correctness, concerning which I now have not a shadow of doubt.

Upon reading an excellent article upon the subject of cheese in the Encyclopedia Britannica, I find the following analysis of the composition of the American cheese sold in the markets of Great Britain:

Water,	27.29
Casein,	25.87
Fat,	35.41
Milk sugar,	6.21
Ash and common salt,	5.22

Investigation, therefore, of the subject shows that of the constituent elements entering into cheese, there is about ten per cent. more butter fat than casein. This seems to explain and verify the correctness of Prof. Brown's reports. . The greatest constituent element of cheese being fat, it follows that the cow giving the greatest amount of fat in her milk, will also give the greatest quantity of cheese. If some of you practical cheese men, upon your return home, will take one quart of Jersey milk and a like quantity of other milk, and by the use of tartaric acid or rennet, will test the quantity of cheese curd from the two samples, you will have a practical demonstration that will satisfy you of the ability of the Jersey cow to make cheese. Before, however, declaring unequivocally to you that the Jersey is by all odds the greatest cheese cow of all breeds, I prefer to await the results of the extensive and exhaustive experiments that will be made in this direction another season. Nevertheless, so far all the trials that have been made seem to point to that conclusion.

As to the healthfulness of Jersey milk, allow me to state that I have with me letters and reports from some of the most eminent physicians, chemists, and microscopists of the United States. These letters and reports I will be pleased to show to any who may desire to see them, but will not occupy your time in reading them. However, they all unite in saying that in composition there is no milk possessing, in equal degree, the elements of nutrition and easy assimilation. On page 303 of the Encyclopedia Britannica, under the heading of "Milk," is to be found the following relating to human milk: "In some women the milk is deficient in fat and casein, and, consequently, less nutritious. Prolonged lactation diminishes the amount of fat and sugar, without materially affecting the amount of albuminous matter, but the milk is less nutritious, and is unfit for the child." Analysis shows that Jersey milk excels in fat, while in quantity of sugar it has four and ninety one hundredths per cent. as against two and ninety one hundredths for common milk. Another, and the strongest claim for the healthfulness of the milk of the Jersey, is in the fact that when the casein of Jersey milk is coagulated, unlike the milk of the common cow, it does not form into a solid mass, but is deposited in flakes, in which condition it is easily acted upon by the digestive juices of the stomach.

Some wise and prudent farmers say that Jerseys are held at fancy figures, and that no man can get his money out of them for the dairy. Let us make some computations. The scrub cow, costing thirty dollars, and making one hundred and fifty pounds of butter per year, will make, in ten years, one thousand five hundred pounds, which, at twenty-five cents per pound, equals three hundred and seventy-five dollars. Will drop, in ten years, ten calves, worth, when two months old, three dollars each, equal to thirty dollars. She will herself sell for thirty dollars. Total received, four hundred and thirty-five dollars. At thirty-five dollars per year for keep, the cow will cost, in ten years, three hundred and fifty dollars; first cost of the cow, thirty dollars; total paid out, three hundred and eighty dollars; leaving a profit on thirty dollars of fifty-five dollars, or one dollar in the scrub has brought in one dollar and eighty-three cents.

The Jersey cow, costing two hundred and fifty dollars, and making four hundred pounds of butter per year, will make, in ten years, four thousand pounds, which, at twenty-five cents per pound, equals one thousand dollars. In ten years will drop five heifers, worth, when two months old, one hundred and fifty dollars each. In ten years will drop five bulls, worth, when two months old, twenty-five dollars each. Will herself sell for beef for twenty-five dollars; total received, one thousand nine hundred dollars. At thirty-five dollars per year for keep, in ten years, will cost three hundred and fifty dollars. Original cost of cow, two hundred and fifty dollars, total expended, six hundred dollars, leaving a profit on two hundred and fifty dollars of one thousand three hundred dollars. Every dollar invested in Jersey has cleared five dollars and twenty cents. This calculation, although making a showing for the Jersey far preferable to the scrub, is nevertheless unjust to the Jersey in placing the same price on the butter, which is of a high quality, as on that of the scrub, which is of a bad quality. As a matter of fact, in any large market, the Jersey butter will bring anywhere from five to fifteen cents per pound more than the scrub butter. Taking, however, the lowest amount of five cents per pound difference, and reckoning as before, we shall have as a showing of a profit for the ten years for the Jersey cow, six dollars for every dollar invested in her, as against the one dollar and eighty-three cents profit to the dollar invested in the scrub. If interest be reckoned in each case, which is the more fair method, the result will be strikingly more favorable to the high-priced Jersey. If the females in each case be retained in the herd until the end of the ten years, and interest reckoned on the butter product each year, the results would be so amazingly in favor of the high-priced Jerseys that I fear none of my hearers would believe my figures to be true until verified by actual computation.

But it is said by some that the Jersey is delicate, and must have warm barns, &c. Well, let me say, I have ever yet to see the breed of cattle that would be profitable in the dairy if their only winter shelter was the south side of a straw stack, or a fence corner. The Jersey, at least, is not that kind of a cow; but she has shown that Nova Scotia, Province of Quebec, and Province of Ontario, Canada, with fair farmer's stabling, have produced some of the largest tests, and that with the thermometer twenty degrees below zero. She seems to do as well in Montreal as in Mobile; as well in Maine as in Maryland and Virginia.

It is said, "Well, they may be good enough, but they are so small." Well, do you want a Jumbo? Among men, David was small, Napoleon was small, but size is not always the true measure of value. A diamond is smaller than a cobble-stone. I attended a fair last fall, and on the grounds was a steer that, by long feeding, had been made to weigh over two thousand pounds. On the same grounds was a little Jersey cow, making within one half ounce of four pounds of butter per day. More people went to see the fat ox at an admission fee than looked at and examined the marvelous dairy cow, free of cost; and I suppose one hundred coveted the possession of the fat ox where one coveted the cow. The one had neither "pride of ancestry nor hope of posterity." From the womb of the latter may come many whose descendants shall enrich the land. But it is further said by some that they will wait—prices will be down. That may be. I, for one, hope so. Prices may go down to one third what they are now, and yet we will make more out of Jerseys than a like investment will yield in any other legitimate business with which I am familiar. However, it is not to be considered within the possibilities that prices will go much lower. Let us look at some statistics.

The American Jersey Cattle Club Herd Register was established in 1868, seventeen years ago. At its establishment, many animals of extreme age were entered; also many dead animals have been entered to complete pedigrees. At present, not far from thirty-three thousand females appear as registered. Is it not fair to presume that about one half of these animals are dead, or non-breeders at this time, leaving but, say, seventeen thousand living animals? The number of milch cows in the United States, as per the census of 1880, was nearly fifteen millions. These cows produced in that year, one billion three hundred million pounds of butter, and four hundred and fifty million pounds of cheese. The value of the butter, at twenty cents per pound, would be two hundred and sixty million dollars. The value of the cheese, at eight cents per pound, would be thirty-six million dollars. Aggregate value, two hundred and ninety-six million dollars. The value of the butter produced exceeded the value of the cheese as seven to one, showing that it is the butter cow, rather than the cheese cow, that is in demand. We ask, is it not fair to presume that, as the merits of the Jersey cow come to be better understood, she will, within the next twenty-five years, displace and replace at least twenty-five per cent. of the scrub cows? To do this, the fifteen thousand Jerseys of to-day must increase to eight millions, in order to bear the same proportion to the one hundred millions of residents of the United States in the year 1905. While prices on Jerseys may not rule fabulously high, yet we confidently believe that for the next twenty-five years the business of their breeding and development will prove both a pleasant and lucrative branch of agriculture. That for the family and for butter the Jersey cow is preëminently the animal, I cannot doubt. I believe in the Hereford, the Shorthorn, and the Polled Angus for beef, and the scrub cow to help us on to poverty. But to recapitulate, I believe in the Jersey—

First, because she is installed the butter cow without a rival.

Second, because recent investigations show that for cheese she equals the best of any breed in quantity, and excels all others in quality.

Third, because in quantity of milk she is far above most breeds, and equal to the very best.

Fourth, because of the richness and healthfulness of her milk for the family, for invalids, and for children.

Fifth, because with a certain quantity of food she will assimilate and convert for her owner the greatest percentage of valuable solids. In selecting a machine, we choose one that, with a given amount of fuel, will exert the greatest force.

Sixth, because she combines the beautiful with the useful. When buying a piece of machinery, or a vehicle, I prefer one, other things being equal, that unites the quality of beauty with utility.

DISCUSSION.

I would like to ask the question whether there is more butter made from the milk of the Jersey cow than from that of cows of other breeds?

Mr. SIBLEY. I can answer for the Jersey cow that I have seen as high as eighty-five per cent. from a single cow. It was an official test.

Dr. RANKIN. I think that Mr. Sibley stated that less than three and one half pounds of milk made a pound of butter, and that there were several cows that make a pound of butter from six to nine pounds of milk. It certainly would be inferred from the statement that the cream is richer, else it could not be done. There is more cheese in Jersey milk, and more butter, than any we know of.

R. H. ODELL. The question which the gentlemen asked, plainly and carefully stated. is this: "Is there more butter in a gallon of cream from a Jersey cow than there is in that of any other breed?" The gentleman did not ask if there was more butter in the milk from Jersey cows than from others, but if there is more butter in a given amount of cream or milk from the Jersey cows—from the same amount of cream raised in the same manner.

Mr. EDWARD BRINTON. Cream is so very different under different circumstances. While the cream in this gentleman's creamery is set twelve or twenty-four hours in a per-cent. glass, or grade glass, would it be justice to submit this Jersey's milk to the same test?

Mr. SIBLEY. I believe that the churn is the one sure test.

Dr. RANKIN. As Mr. Sibley says, is to skim the milk and churn it as thoroughly from one as the other. Mr. Abbott, of Philadelphia, has been conducting a series of experiments, and he secures ten cents a quart for the milk of the Jersey and Guernsey, and eight cents per quart for that of the other breeds, simply because it is richer milk. We should not test it by the per-cent. glass, but by the churn, because there is no reliability to be placed in the per-cent. glass.

Col. R. P. MCGLINCEY. We have a variety of different systems in the dairy business in the West, and a certain line of tests have been used. Now, we have no thoroughbred Jerseys; we have what we call the native cattle. We think we cannot get more butter from the same quantity of cream of the Jersey breed than from any other breed.

Mr. FAIRWEATHER. I think that I know something about Ayrshires, and I think I can show by the same reports that the Ayrshire is the most valuable animal. The Jersey does not give a large quantity of milk. We cannot use the milk for different purposes. Mr. Sibley is far above the average. The cow that is the most profitable is the cow that gives the most milk on grass-feeding. There is nearly two per cent. difference in solids between the Ayrshire and the Jersey, and that is what I consider the true test.

Mr. SIBLEY. I want to say this: Whether it pays to feed a cow or not, I always did like the Ayrshires, and I want to place on record my evidence in the belief that no man can afford to underfeed his stock.

Mr. FAIRWEATHER. I am no more against feeding a cow than he is.

Mr. FOX. I would like to ask whether there is any difference in the Jersey butter than in any other cow—the Holstein and the Ayrshire—or more oil in one than in the other, and if the Jersey butter sells for its richness?

Mr. SIBLEY. I have never made any test, but I thought I knew a good cow, and I believe in feeding the cows.

W. P. HAZARD. For the amount of food fed, the Ayrshire gives the largest amount of milk and the largest amount of butter.

Mr. PHELPS. We claim that the Jersey makes the most butter, and also the most cheese. In regard to the experimental station, he says that the Jersey is ahead in cheese; that the Jersey cow is the greatest cheese cow. For instance, you take ten or one hundred pounds of Jersey milk—it possibly may make more cheese than that of any other breed. A cow giving five quarts of milk, and making more butter out of it, which is worth the most—if the Holstein cow makes six pounds of butter on a given amount of milk?

Mr. SIBLEY. When my friend convinces me that the Ayrshires are better than the Jerseys, I am going to keep them. We should have an experimental station in this State. Experiments will be tried in several States this year.

Mr. STURTEVANT. If the people make a class of butter that is worth the money, and ask it, they will get it.

Mr. PHELPS. I am not exactly satisfied yet in regard to that cheese and butter test. I do not believe that the Jersey cow is the best. I have run a cheese factory for fifteen years. Casein and butter-fat are two different things naturally. Now, in regard to raising calves, I believe to-day that plenty of Holstein milk, fed clear, will grow a calf faster than any Jersey cow on earth, because it has the casein. Casein makes the bone. I have heard it said that Jersey milk will kill a calf; they argue that it is too fat.

Mr. ODELL. The real point in this matter is that one hundred pounds of milk from a Jersey cow will make more cheese than one hundred pounds of milk from the other breeds. If that is the case, I think, with Mr. Phelps, that it simply comes from the fact that the butter will retain more moisture than the casein, and more than it will from the Holstein. I would like to have it distinctly stated, if the quantity of cheese depends on the quantity of milk.

Mr. SIBLEY. I spoke of having a friend in Canada who had been investigating as to how to get rid of the casein in milk. He used tartaric acid. He believed that the Jersey cow was the greatest cow for cheese.

Prof. ROBERTS. Nearly all of us make our cheese too dry. One experiment you can make—you can put two animals together, and you tell which is the better breed. We may find that the Jersey milk, pound for pound, is worth more than any other milk. I think that these noble breeds should have a fair test.

President FULLER then announced the meeting adjourned until 7.30, P. M.

EVENING SESSION.

Meeting called to order by President FULLER at 7.30, P. M., who introduced Prof. I. P. Roberts, of Cornell University, Ithica, New York, who gave the following interesting talk regarding

THE NEED OF, AND BENEFITS TO BE DERIVED FROM, GENERAL IMPROVEMENTS ON THE FARM.

Since all flesh is grass, we must first turn our attention to the pastures and meadows. Most farmers think that manures and fertilizers are about as good as thrown away when they are applied to grass lands. Usually everything is saved to enrich the tobacco patch and the wheat field. The true policy is to put nearly all of the manures and fertilizers where they will tend to produce the most grass; then the wheat and tobacco may be raised at a profit without manure. I think it will be found that when the value of the land does not exceed one hundred and fifty dollars per acre, permanent pastures, properly treated, will be found to be more profitable than soiling.

We find many old permanent pastures where a critical examination will show that hardly half of the ground is actually covered with grass. We shall find many weeds mixed with many varieties of inferior and stunted grasses. You all know the difference between the taste and relish of a stunted, knotty apple and one that is round and plump from having received an abundance of nourishment. An analysis will show but a slight difference, if any, in their composition; yet one will nourish and be eaten with avidity, while the other, if it can be eaten at all, will prove to be nearly indigestible.

We find a like difference between the grasses grown on starved land and those grown on improved and highly fertilized fields. No cattle foods, all things considered, are so cheap and healthful as undried grasses and clover; hence, it is the very worst economy to starve or overstock pastures.

To relieve and fertilize them to some extent, feed a partial ration of bran daily. In the fall pull the larger ears to feed the pigs, and give the smaller ones, with the green corn-stalks, to the cattle. Sow

German potash salts, a hundred pounds to the acre yearly, for five years; roll the pastures, pick the stone off, spread all the old mortar, coal ashes, half rotten straw, and odds and ends of every kind on the poorer places; then, if possible, spread good farm-yard manure all over them from fence to fence.

Remember that the beginning of successful dairying is found in the pasture field.

Winter Feed.

Cattle may be cheaply and successfully wintered with but little hay if there is a fair amount of straw and corn-stalks on hand in the barn. We have found that the most economical way of securing hay is to sow *clover* and *timothy* in the growing wheat—the latter in the fall, the former in the spring.

The following year the land produces a very heavy crop, which is made into hay. If the second growth is saved for hay, we can get on an average from the two cuttings three and a half tons per acre. We find that if this land is saved for mowing purposes the second year, that the yield of hay is lessened from twenty to forty per cent. We find also that in our locality we secure far better results by sowing our grass and clover in the growing (fall) wheat than by sowing it alone.

The wheat and grass start early in the spring, and keep down the weeds, (which are, as a rule, but annual plants,) thus giving the grass full possession of the land as soon as the grain is harvested; while, on the other hand, if the grass is left alone to battle with the weeds in its weak condition, the weeds being stronger and faster-growing plants, soon appropriate the soil and sun to themselves; so that at harvest time, instead of having a crop of wheat and a field well seeded, we have a crop of weeds and little grass. Corn-stalks, not fodder corn, are valuable adjuncts to winter feeding, and should be saved with great care. The corn should be cut when fairly ripe; it is a great mistake to cut plants designed for forage before the sugar is developed in them; true, the woody fiber increases as the plant approaches maturity, but an abundance of sugar with some woody fiber is much to be preferred to a bitter, unpalatable fodder measurably free from woody fiber.

The husking should be done two or three weeks after the corn is cut, and the stalks should be drawn to the barn some dry windy day about ten days after they are husked.

I have the best of evidence that an acre of ordinary field corn produces more food for cattle than an acre of either northern or southern sowed or drilled fodder corn. Therefore, I would recommend that the effort be made to raise the largest possible amount of corn per acre, and that the stalks of the corn, with the smaller ears, be fed in the pastures to the cattle as soon as the corn is glazed. This will be as early as fodder corn is fit to feed.

The supposition is that every farmer understands economy well enough to keep his straw where it is dry and accessible.

Without doubt it is economy to have some succulent food to mix with the dry fodder.

Mangels grow far better than turnips in some portions of Canada and in most portions of the United States. We have the choice in some localities between ensilage, turnips, and mangels. I dispose of the ensilage by saying that no dairy farmer should feed it. Climate and conditions will decide the choice between turnips and mangels.

Last year on the University farm one and a half acres were cultivated to sugar beets and mangels, with the following results:

Roots,	49,145	tons.
Tops,	13,957	"
Yield per acre:		
Roots,	32,076	"
Tops,	9,305	"
Total yield per acre,	42,065	

The acre and a half was divided into four plots.

Plot two, which was planted to sugar-beets, gave twenty-five and nine hundredths tons of roots, and eleven thousand four hundred and forty-nine tons of tops per acre. Total, thirty-six thousand five hundred and thirty-nine tons per acre. Plots one and three, planted to mangels, gave thirty-four thousand nine hundred and thirty-seven tons of roots, and nine thousand and thirty-eight tons of tops per acre. Total, forty-four thousand and twenty-five tons per acre.

The total cost of raising and harvesting, including sugar-beets, was one dollar and sixty cents per ton, or forty-eight cents per bushel. This is approximately correct, and includes rent of land and cost of manures.

I have now intimated what provisions should be made for winter feeding.

It is a good plan to have a small engine and boiler in the barn to warm water, cut feed, and do other necessary work.

The following I give for a ration for three large cows in full milk, their total weight being three thousand five hundred and seventy-five pounds:

*Clover hay, $13\frac{5}{9}$ pounds.
Corn-stalks, $4\frac{5}{9}$ pounds.
Cotton-seed meal, 5 pounds.
Cornmeal, $4\frac{6}{9}$ pounds.
Malt sprouts, $4\frac{6}{9}$ pounds.
Product per cow per day:
Milk, $31\frac{2}{3}$ pounds.
Manure, $89\frac{1}{2}$ pounds.

From the above, we have the following estimate for three days:

Food Consumed.

122 pounds clover hay, @ $8 per ton,	$0 49
41 pounds corn-stalks, @ $4 per ton,	08
45 pounds cotton-seed meal, @ $26 per ton,	59
42 pounds cornmeal, @ $26 per ton,	55
42 pounds malt sprouts, at $14 per ton,	29
Total value,	$2 00
45 pounds cut corn-stalks for bedding, @ $4 per ton,	09
	$2 09

The amount of nitrogen, &c., in the food consumed in the three days was computed from Mr. Wolff's table, and its value for manure was estimated as follows:

7.74 pounds nitrogen, @ 18 cents,	$1 39
4.65 pounds potash, @ 5 cents,	23
3.27 pounds phosphoric acid, @ 8 cents,	26
	$1 88

It appears from the above, that the food consumed by the three cows in three days, was worth, as a manure to spread directly on the land, one dollar and eighty-eight cents, or in other words, it would cost one dollar and eighty-eight cents to have purchased the same amount of plant-food in the form of fertilizers. German experiments show that cows in milk take from their food about twenty per cent. of its manurial value.

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* Taken from third report of Cornell University Experimental Station.

Deduct thirty-seven cents as the twenty per cent., and we have one dollar and fifty-one cents, the value of the manure of three cows for three days, or sixteen and seven ninth cents per cow and day.

Cost of keeping three cows three days,		$2 09
Value of manure produced,	$1 51	
Value of milk produced @ 2½ cents per pound,	7 13	
	$8 64	
Apparent value in favor of products, from which must be deducted labor, interest, &c,		6 55
		$8 64

At one and one half cents per pound for the milk, the balance would be four dollars and twenty-seven cents. The cost of the food required to produce a quart of milk in this case, was a trifle less than one and one half cents.

Since the manure is worth about halt of the cost of the feed, the stable floors should be tight. The manure of the dairy is of more importance than the milk, though it is usually not worth as much. How long are we to go on in this way?

If the milk is wasted, and the manure saved, one will soon drift from dairying into profitable beef and cattle-raising, and the farm will be increasing in value and fertility.

If the manure is wasted, and the milk is saved, one may go on swimmingly for a few years, but the children or grandchildren will have to flee to the city to escape the poor-house.

Labor must be economized. To do this, the land must be enriched. How shall we begin? By mending the stable floors. Half of the manure is often lost before it leaves the stable, and half of the remainder before it is converted into an available form and used by the plants.

Let me tell you an open secret, which should be repeated from every stable door in the land: Profitable farming, intelligence, and education depend more on the fertility of the soil than upon any other one thing.

Then husband and transport to the field, in the best shape, everything that will make plants grow, and then you will have to "take no thought for the morrow, what ye shall eat, or what ye shall drink, or wherewithal ye shall be clothed." "Feed the land, and verily thou shalt be fed."

I think I hear you say, "Professor, all this sounds very nice, but the good wife and I have worked hard and faithfully all summer, and we are no better off than we were last year this time, and it has been just so for several years, and the children are getting larger and the farm is getting poorer, and we are getting older, and we would send Jane and John to Cornell, but we are too poor, and farming don't pay."

This appears to be a truthful, fair statement; but is it? Let's see. I doubt whether there are two farmers in the audience who can tell how much they were worth at any time within the last five years. Pardon me if I say that I doubt if one farmer in ten knows, even approximately, the profits or losses of the farm of any one year since he began business.

They say farmers are always grumbling, either on account of the season, the hard times, the hard work, or the losses.

This is partly true. Let me make a few practical suggestions: Now, the first thing to do is to do our duty. Stop grumbling and give thanks. We have been bountifully fed and clothed, and comfortably housed; we have been protected in person and property, and have had many spare moments for gaining knowledge and pleasure from current publications furnished at nominal cost; and, in addition, we have had all the delights and health of rural life. Let us rise to the dignity of our profession, and with cheerful courage attack the knotty problems that stand in the way of greater success.

First, let us find out what is our own, and what belongs to somebody else—that is, "take stock," and face our debts. Many a man has been bankrupt because he had not the moral courage to add up honestly the debtor side of the account.

Second, let's stop the leaks. Five cents a day saved from the time a young man is married till his oldest son is ready to enter college, will pay all necessary expenses of a four years' course in college, or it will give him a nice start in life. I doubt if there are a dozen barns in Pennsylvania where not five cents, but ten times five cents, could be saved daily by a little scientific intelligence.

The time has come at last when a public speaker is not hissed off the stage because he talks of scientific agriculture. The farmer of the Eastern States who ignores it will find that success in this advanced age comes not by muscular effort alone. The boy of to-day, with his sulky-plow and self-binder, can rob the soil of more plant-food in a year than his grandfather could in all his lifetime, though his muscular grandfather might have carried off with ease two such boys—one under each arm. Modern inventors have placed in our hands the implements with which we may slaughter, if we will, that which for all years to come should produce the golden eggs. Scientific methods alone can save us. History will repeat itself. Like the nations of the East, we shall be compelled to abandon the soil made barren and worthless by unscientific agriculture.

A few farmers, and but a few, have, by scientific methods, gradually increased the productive power of their land; but nine tenths of our arable acres east of the Mississippi are poorer to-day than they were thirty years ago. How much longer can you farmers of Pennsylvania go on at the rate you have been going? The average yield of wheat in your State in 1885, was ten bushels; rye, nine bushels; oats, twenty-seven bushels; barley, eighteen and a half bushels. These average yields measure the fertility of your soils combined with your present knowledge of agriculture. Is this a record to be proud of? And while you are raising ten bushels of wheat per acre, you are fighting your agricultural college. Would it not be far wiser to rally round the struggling institution which has *your* interests at heart more than any other? The students call their college *alma mater*, (loving mother,) then why not criticise *your* college as you would your loving mother, and be as ready to defend her? New York is little better with all her grand facilities for teaching agriculture and the sciences which underlie it.

In 1885, she raised but fifteen and a half bushels of wheat, twenty-eight bushels of oats, and twenty-two bushels of barley per acre. In the dairy district it takes from three to five acres to support a cow, and on many farms the pastures are growing steadily poorer, and the land is already so exhausted that if the sod is broken up it is almost impossible to get the land seeded down again to the better tame grasses.

Has not the time come when there is room for scientific agriculture? Thirteen and one half bushels of wheat in 1884 and ten bushels in 1885 per acre in the great and proud State of Pennsylvania. Is it not time that your farm boys began to study a little agricultural chemistry?

How long will it be before we shall see fields turned out to commons. abandoned, given over to weeds, bushes, and briers, because of the utter poverty of their soils? How long will it be? The time is already here that thousands upon thousands of acres of land once moderately fertile will not pay a fair compensation to those who cultivate them, let alone paying rent or for improvements. Is it not about time that our boys learned something of ancient history that they may know how other nations have fared who have gone blindly on, robbing the soil, ignoring science, thinking only of self and the present?

Ten, fifteen bushels of wheat per acre in the fairest valley the sun ever shone upon, occupied by a people with facilities for acquiring knowledge equaled by no other people on the face of the round globe. As our cheeks blush for shame, shall we not here and now demand that both State and Nation furnish the best possible facilities for gaining knowledge, not how to rob the soil, but how to put in practice systems of recuperating agriculture; systems that shall harness science to the plow so that our grandchildren may reap a more abundant harvest? The boys of the eastern United States are not being "educated" off the farm, but starved off.

WEDNESDAY MORNING, *February 10, 1886.*

Meeting called to order by President FULLER, at 9.30, A. M. Committees appointed.

Finance.—R. H. Odell, J. B. Phelps.

Dairy Utensils.—George Spitler, R. C. Ferry, John Fox.

Nominations.—W. P. Hazard, John Fuller, A. R. Sturtevant.

Miscellaneous Business.—M. W. Oliver, L. C. Magaw, A. S. Bates.

The SECRETARY read a communication from the Produce Exchange of Philadelphia, soliciting the aid of the Association in enforcing the law against adulterated dairy and other food products.

Mr. OLIVER explained the matter to the Association, and spoke very strongly in favor it, and hoped the Association would appoint such committee.

Col. R. P. McGLINCEY. I have had some little correspondence with the Produce Exchange of Philadelphia, and think if the oleomargarine and butterine men want their meeting held in Philadelphia, we ought to go there. Dairy conventions have been the means of helping the Western manufacturers of butter and cheese, and I think that the holding of such a convention at Philadelphia will be beneficial to the farmers of the State.

W. P. HAZARD. We should be very careful not to compromise ourselves in this matter, as this Association handles large quantities of bogus goods, as well as first-class dairy products. We must be careful not to give encouragement to the sale of the spurious products of the dairy.

The CHAIR then instructed Messrs. Magaw, Oliver, and Bates, the

Committee on Miscellaneous Matters, to prepare resolutions, and requested Colonel McGlincey and W. P. Hazard to confer with them.

Mr. M. W. OLIVER offered the following resolution, which was adopted:

"*Resolved*, That the Pennsylvania State Dairymen's Association extend its influence and aid to the Farmers' and Creamerymen's Protective Association of Philadelphia, in their efforts to defend the law, and thereby bring about the prohibition of the manufacture and sale of *adulterated* dairy products."

THE CREAMERY SYSTEM AS PRACTICED IN EASTERN PENNSYLVANIA.

By EDWARD BRINTON, *West Chester*, *Pa.*

We introduce our subject with the statement, which we know will not be questioned, that the creamery system in Eastern Pennsylvania is no longer an experiment, but an established industry of no mean proportions. Though its growth has been so extensive, its age can still be counted upon your fingers, for seven years ago a creamery was a new and novel affair in all our eastern counties, and was regarded by the farmers with askance looks. Now they are found dotted quite thickly in every dairy district within one hundred miles of Philadelphia. Their number is constantly increasing, not in the heretofore dairy neighborhoods, but their existence it widening the present and creating new dairy districts, where formerly farmers supposed they were too far from railroad accommodations or a market to make dairy farming possible. The rapid and continued growth of this system, its present prosperous condition, its fast increasing popularity with the farmers, allows the unqualified assertion that it is a success. But before enlarging on that all-important part of the subject in hand, it would seem proper and necessary to describe, in as brief a manner as possible, the creamery system as it is conducted generally in our eastern counties.

The creameries are operated either by an individual owner or a corporation of farmers, who issue stock sufficient for capital. In the latter case, the management is with a board of directors, who, after paying each month's expenses, divide the balance of money on hand among the patrons of the creamery *pro rata* to the amount of milk furnished. This settlement is generally made about the tenth or fifteenth of each month for the previous month's milk.

While a few of these coöperative or stock creameries are being ably and successfully managed by the farmers, many have experienced indifferent success, and are rapidly passing into the hands of individuals, while the new ones being started are almost invariably the enterprise of private capital. To one acquainted with the workings of a creamery, the reason of this is quite evident. To make them profitable and successful, they must be managed by parties who must understand practically the every-day workings in the factory, the markets where the goods are to be sold, and have good business ability. In the case of stock creameries, where the management is with a board of farmers, who know little about the practical part of the business, and are seldom at the creamery, everything depends on employés, and they generally of most expensive kind, the consequence is the goods are often not up to the standard, and, if so, they are not marketed so as to bring the best returns. But the individual who is the proprietor of a creamery is directly interested in the results, and if he is a practical creamery man, energetic and of good business habits, success is assured. In this section, individuals have paid, after keeping a fair profit for themselves, a higher average price for milk than the stock creameries, which are supposed to pay out all receipts after deducting expenses. This undoubtedly speaks well for private management, yet the patrons are constantly complaining that creamery proprietors are making too much off the (farmers') milk; yet, when they take the reins themselves, their receipts are generally less, without considering the risk and the trouble. It must be remembered that all material handled at a creamery is of an exceedingly perishable nature; it must receive attention both as to its manufacture and marketing at exactly the right time, and it stands to reason that this will be attended to more correctly by the owner than by employés. In the early days of creameries, when they were new and untried, private capital hesitated to take hold, but their usefulness and success soon became self-evident, when plenty of qualified persons were found anxious for the venture; nor can a single failure be cited where any degree of energy and ability were brought into play. We first built our creameries with the idea of making both butter and cheese, and many were so run successfully. The milk would be received in the morning, put in cooling vats, and rapidly reduced to a low temperature. In about six hours the separation of milk and cream would be sufficiently complete. The part skimmed milk would be run into the cheese vats, and at once made up, and the cream churned into butter after it had sufficiently ripened or soured. By this process, about three and one half pounds of butter were made out of one hundred pounds of milk, leaving a fairly good part skimmed cheese.

Some creameries adhered to the dairy process of allowing the milk to set until all the cream raised, and letting the skim milk go for hog feed. But the introduction of the centrifugal cream separator revolutionized the creamery business, and the operator finds he can take four and thirty to fifty one hundredths pounds of butter out of one hundred pounds of average milk, leaving him his skim milk pure and fresh, but without a particle of fat in it, and the question at once came up, how could we best utilize this milk?

Those having cheese appliances in their factories began making a full skim cheese, but with such uncertain success that very few have continued at it, and they during the few winter months only. This cheese realizes the operator but from two to three cents per pound, and is often difficult to sell at any figure. This skim milk contains, of course, all the casein and sugar that the whole milk did, and is first-class for hog feed, for which purpose the largest portion of it goes. Most farmers are anxious to take a portion of it back with them at a cent a gallon, the price generally asked by the creameries. Many creamery operators keep themselves a large number of hogs to consume all the offal from their factories, and consider it quite as profitable as selling the skim milk at a cent a gallon. Occasionally a local trade is found for the curd made from thick milk, which is fairly remunerative. There is yet another use which separator skim milk can be put to that is undoubtedly growing, and will grow in favor among farmers—that is, it is suitable for raising young calves. The separators are started as soon as milk is received at the factories, which enables the farmers to take back with them the entirely fresh and sweet skim milk; this the youngest calves will relish and thrive on, but it must be fed with great care and moderation, and it is better to mix a small portion of bean or cornmeal with it.

Throughout eastern Pennsylvania the manner of handling the cream and converting it into butter is very similar in the several factories. The separator cream is allowed to stand until thick and sour before churning. The butter is generally printed in pound or half-pound block prints, and the product of each day is at once marketed. During the flush of milk in spring and early summer, a portion of the butter may be solid packed, but only a small part of the whole, and that only for a short time. Has the introduction of separators been an advantage to the dairy and creamery interests? Their growing popularity and universal use would seem to answer that question, for we know of no creamery where they are not at work. The fact is established beyond dispute, that they take from the milk from six to ten per cent. more butter than any method formerly employed. This fact would seem to make their use imperative, for it costs no more, in fact less, to produce butter with the separator than by the methods formerly employed.

But is this butter as good an article in every respect as formerly? In the first place, we must recollect that when the separator went into a creamery the operator discovered he had almost the entire business to learn over again, for everything was different. By experiment, he found the best results were obtained by heating the milk as it passed through the separator; then the cream must be quickly and thoroughly cooled, but not churned until it had obtained a decided acid, and in the meantime carefully cared for. Also the milk must be watched, and notice taken that it is in good condition when it goes through the machines, and many other points that had not before come up in the management of a creamery. While the operator was learning all this, many mistakes were unavoidably made which hurt the reputation of separator butter. But creamerymen have learned how to handle separators and separator cream and butter, as they were bound to do when the great advantage to be derived by their use became known.

Creamery butter, be it separator or not, now stands at the top of our market quotations, where it will continue to be, for it is regular in quality, which is uniformly good; besides, a regular supply can always be depended on by those dealing in it. Now let us consider the farmer's relation to the creamery system. Does it promote his interests? Taking the broad but certainly true ground that this is eminently an age of successful specialties, and farming proper is a *farmer's* specialty, he had best let some one else make the butter.

Time was when the carriage-maker made his own wheels and shafts, the blacksmith, his horse-shoes, the carpenter, his doors, window frames, and mouldings; but the manufacture of these, and a hundred more others that could be mentioned, became a trade of themselves. The result of this is that they are neater, better, and more cheaply made. The same would seem to apply to the farmer and his butter—that is, as a general thing; of course some may have a particular fine trade, or a thoroughbred herd of cows, or some other reason that would make it desirable and profitable to make and sell their own butter. If a dairy farmer will carefully compute it, he will find that it costs him at least five cents per pound to manufacture and market each pound of butter. If the creameryman had that amount net profit on each pound of the thousands he handles every week, he could consider he had a bonanza;

of course he has not, and the difference goes to the farmer directly; that is, supposing the dairy and creamery butter brought the same price, but all market reports quote creamery from two to five cents above dairy goods. This means a decided advantage to the creamery, which means a like advantage to its patrons. There is at least two obvious reasons for this difference in price. The creamery operator, with but one business to attend to, watches the markets closely, and knows just when, where, and how to sell; again, his butter is naturally very near the same thing every day of the year, and the supply can be depended upon at all seasons.

These facts will make creamery butter in demand when dairy butter is hunting market. Some dairy farmers are of the opionion that to sell their milk is taking too much off the farm; but it is a poor creamery manager who will not sell to each farmer his proportion of separator skim milk at one cent per gallon the entire year. Undoubtedly, were the farmers of the butter markets and they under the control of creamerymen, a nearer uniform and better price would be realized, as the supply would be made nearerto meet the demand; and fewer dealers having these goods for sale, a unity of action would be more likely to follow, also the fight against adulterated dairy products would be more systematically, and hence more successfully, carried forward. To the dairy farmer living within shipping distance of large cities the question presents itself, would it not pay better to ship their milk to such markets for retail purposes? Generally, there is little more than the cost of the freight between the creamery and the city price. But the circumstances attending this phase of the subject are so different in different localities that it would be impossible to speak intelligently upon it.

The markets for all dairy products have been depressed, dull, and unsatisfactory for several years, and the question seriously debated in the minds of many farmers is, "Does dairy farming of any kind pay?" and to the general farmer we fear it will always be an undecided question; he does not take the trouble to find out. His accounts are too often kept in a memoranda book carried in his coat pocket, which keeps him posted as to when his hired man came, or when that cow will calve, or when his notes fall due. He may, perhaps, compare his present condition with that of the year previous, or whether he was keeping his family as well or meeting his obligations as easily, or he may make a general comparison of his financial condition with what it was five years before, and draw conclusions therefrom—but with his many thousands of dollars invested, he can rarely be certain what part of his business does or does not pay, nor can we speak conclusively in the matter, but we state a few facts for your consideration.

The creameries of eastern Pennsylvania paid the farmers an average price of three cents per quart for milk during the year of 1885. This means about thirty cents per pound net for the butter that milk would produce, and the producer had none of the work butter-making and marketing would cause.

Several farmers whom we have asked to divide their number of cows into the total amount of money received for their milk during months, found they have sold from seventy to eighty dollars of milk for each cow kept. Is not this, when we take into consideration the depressed condition of all kinds of business, rather encouraging than otherwise?

To the creamery operator it would seem that the signs of the times are not discouraging; if adulterated butter is not put down by law, it will be by the fast-growing public feeling against it. The introduction of the separator has lessened at least one third of the expense of building and furnishing a creamery. In Mississippi, the value of land was raised from ten to fifteen per cent. by the introduction of a creamery in that section, and farmers in all sections will hail their introduction with delight, and all past experience has shown they will liberally patronize them if they are conducted in a business manner.

The dairy interests of Pennsylvania are represented by thousands of intelligent and enterprising farmers and millions of dollars of capital. If their interests can best be maintained and promoted by coöperation and consolidation in the matter of butter and cheese-making, then let that be the way.

Mr. Brinton was followed by Mr. WILLIS P. HAZARD, of West Chester, Pa., in a lengthy written address on "Grading Up Dairy Stock," which address the author failed to deliver to the Secretary, consequently it is not embodied in this report.

An address by Dr. G. T. RANKIN, of Linesville, Pa., entitled "The Coming Cow," was not delivered to the Secretary, hence it is not printed.

AFTERNOON SESSION.

President A. M. Fuller in the chair. Awaiting the arrival of the speaker for the session, Col. R. P. McGlincey, of Elgin, Illinois, remarks from Mr. William Fairweather, of McLean, Erie county, Pa., were called for.

Mr. FAIRWEATHER. I am not prepared to say anything just now. I would suggest that you call upon some other one.

The CHAIR. Let us hear from Mr. Phelps.

Mr. PHELPS. Last evening, Prof. Roberts spoke in regard to silos. I understand we have men here who are using it every day. I would like to have some information on the subject. I would like to hear from Mr. Sibley.

Mr. SIBLEY. There has been considerable doubt about the effect of ensilage upon the quality of butter. Mr. Havemeyer is feeding nothing but ensilage and grain, and his butter is of very fine quality—although I do not believe in keeping an animal exclusively on ensilage. We feed about ten pounds per day. Hay, at Franklin, is worth about twenty-five dollars per ton. I have heard it said that ensilage is not good for horses. We have about forty head of Shetland ponies that had nothing but ensilage all winter, and came out well in the spring. Therefore, I am not ready to discard my silo. You cannot keep stock on anything as cheaply as ensilage. We have a bull that for two years has had nothing but ensilage, no grain at all. He is as fat as butter. Our experience has been very satisfactory. I do not understand the extremely bad smell Prof. Roberts speaks of. I would not want to feed any steady article. I would like to ask in regard to the Miller system of farming.

Prof. ROBERTS. The sample of ensilage is here on the window. It is not so bad as the worst, nor is it so good as the best. See if you do not agree with me that ensilage is a little too highly flavored. The best feed we can give to our dairy cows is none too good. Our cows have the very purest water, and the very cleanest stables. I merely tried ensilage to see if it was a better feed than hay or oats. The very best conditions are none too good for the cow. A little acid in the stomach helps the animal to digest more easily. I can see no reason for spoiling fodder by putting it into ensilage. No man can use ensilage until he has got some method by which he can keep it from decomposing. I know a man that will use half a pound of tobacco a week, and half a gallon of whisky a week, and go on living right along. We can do almost anything, and so I imagine you might breed a Jersey who would have an abnormal appetite for ensilage.

Mr. SIBLEY. I would like to have the sample of ensilage examined. It is stronger than any I have ever seen. I would like to ask Prof. Roberts whether he would think I did not want to raise a race of ponies that could not go by a saloon without stopping to take a drink.

Prof. ROBERTS. When I put corn in with the ears on I got a good deal sweeter product. It is my opinion that you cannot afford to use ensilage as the main food of the cattle, and that you cannot produce, on a rule, taking the land into consideration, you cannot raise a ton of ensilage any cheaper than you can a ton of mangels.

Mr. EDGAR HUIDEKOPER, Meadville, Pa. We are feeding ensilage out now. We began the day after Christmas, we have not been feeding it near two months. It makes a greater flow of milk over dry feed. I prepared the ground in good shape, and drilled the corn in in June. The first crop did not come up at all; then I harrowed the ground over clean, and drilled the second time, I think about the 10th of June. Farmers went by and laughed at me, but before the fall was over, I think it was the best crop of corn I ever raised. I built this silo of plank, twenty feet square and twenty feet deep.

Prof. ROBERTS. How many pounds' weight did you put on your silo?

Mr. HUIDEKOPER. About one hundred pounds to the square foot. When I cut the corn, the ears were forming on the stalks, at the same time the stalks were much finer than if it had been raised as field corn.

Prof. ROBERTS. How many tons did you estimate were on your nine acres?

Mr. HUIDEKOPER. I cannot tell how many tons we did have.

Prof. ROBERTS. If your silo was twenty feet high, you had eight thousand four hundred cubic feet in your silo, and that would give you on your nine acres thirteen tons per acre. That is the point I wish to call attention to. Thirteen tons per acre is a very fine field of corn.

Mr. HUIDEKOPER. My impression is we had one hundred and ten loads; that would give us about twelve and one half tons to the acre.

Dr. RANKIN. If the ensilage question is through with, I understand that I said in my address that they raised forty thousand bushels of corn on forty acres out West. It was written on the paper four thousand bushels.

The following resolution was adopted:

Resolved, That this Association return thanks to the *Oil City Derrick* for sending a representative to our annual meeting, as the only daily paper outside of the county that had a representative.

President FULLER. We will now be obliged to close the ensilage question, and proceed with the election of officers.

The election resulted in the choice of the officers named at the commencement of this report.

President FULLER. We are now ready to proceed with the regular order of business of the convention. We will listen to an address from Col. R. R. McGlincey, of Elgin, Illinois, subject—

WINTER DAIRYING AS PRACTICED IN THE NORTH-WEST.

Col. McGlincey. Our farmers engaged in the dairying business because they had to. They raised wheat until the ground was exhausted. There was nothing left on the soil in the way of the material soils, and in consequence wheat could not stand up. They did not even get their seed that they had sown, so they turned their attention to dairying. We have a large number of butter and cheese factories. We sell from five to twenty thousands pounds of milk daily. We ship every morning from ten to twelve car-loads to Chicago. We have a milk condensing factory that consumes seven thousand pounds daily. We are able to get rid of our milk immediately.

The question of dairying in the West is a very interesting one. I will endeavor to get down to the gist of this interest as rapidly as possible. Now, our farmers are in the dairy business, not for their health, but for the money they get out of it. They make it as much of a business as any banker or any railroad man, and in order to make a business, they must have some qualifications, and they have succeeded very well, and make butter a product, and lay up something for a rainy day.

Eighteen years ago, there was scarcely a farm in my county that was not mortgaged among the directors of our two National banks—seven of the number in the two dairy banks are dairy farmers. They are stockholders and directors, and made their money out of the cow.

In winter dairying, we feed more grain than in summer. We shelter our cattle better, and provide them with better covering. Our milking is done regularly at a given hour in the morning and in the evening. Nothing is done to excite the cow.

Now, in relation to the feed. I thought it might not be amiss to ask one of the oldest and one of the wealthiest farmers in our section to give me his feed-ration for his dairy herd, and while it differs from some of the others, it would be about an average of what our farmers feed. This gentleman represents a herd that averages sixty cows.

Feed for three winter months, daily to each cow, sixteen quarts cornmeal, oats ground, and middlings equal parts by weight. During October, something less of grain was fed, pumpkins being substituted. During the winter months, hay once per day, corn-fodder twice per day. Cows are allowed to run in the yard from nine, A. M., until four, P. M., when the weather is pleasant, with freedom to water.

The President of the Dairymen's Association, his feed-ration for fifty-five cows, twelve quarts of shorts mixed half of each, and two bushels of cut corn without husking, and about ten pounds of hay per day. They also use the new process oil-meal.

As one of the leading farmers and dairymen told me on Monday, a cow is a machine, and you must put all the feed into that machine that the machine can master. We use our cows as a machine, milking them up to within six or eight weeks of the time of calving. Let me say to you, gentlemen, that you cannot afford to not feed. It is utterly impossible to get milk out of a cow unless you feed the cow, and you must bear in mind that if you feed well, you will get good returns from the cow.

In summer they have good pasture, and they feed more or less grain.

The milk is richer in the summer than in the winter, and it does pay to feed the cow. You must speak to a cow as you would to a lady. Be kind to her, and that kindness will be rewarded by a large quantity of milk.

In relation to our factory system, our farmers near Elgin have these three means of disposing of their milk: Where the milk is delivered at the factory, the farmers draw the milk to the factory. The milk is not drawn more than three miles, and is delivered at the factory as early as possible after milking—eight or nine o'clock—and weighed before the patrons. The factoryman then sells the product, and, after deducting the cost of making—four cents for butter; two cents for cheese—divides the remainder in proportion to the amount of milk received from each patron.

In relation to the gathered-cream system, I am not quite so familiar. The operator of the creamery sends his wagons to gather the cream. It is supposed that one inch, in a Fairlamb can, of cream will make a pound of butter, but it does not always do so, and, to make a fair surfeit between the factorymen and creamerymen, they collect a quart or pint of cream from each one of the patrons and have it churned separately. The amount of butter that is churned from a quart or pint of cream, if we get ten per cent. from that, the per cent. of cream is figured from one quart—a system that is certainly better than taking an inch of cream for a pound of butter. Sometimes the creamerymen buy direct, and if they are allowed to get a little more than an inch of cream, they would pay within ten cents of what that butter sells for. If creamery butter is worth twenty-five cents, that inch is worth sixteen cents, so that, under these systems, our farmers seem to be satisfied. My butter commands the highest price in the Chicago and New York markets, and I think we are making a little better article than can be made in a creamery. It will keep better than any creamery butter that I have seen.

Now, with these various systems, our people have been able to make money from the very start. We raise corn, oats, and hay. Our lands in our immediate section, within a radius of ten miles, are worth eighty dollars an acre, and it don't pay the farmer to raise wheat. He can get more money out of his land by raising dairy products and cattle. The more manure you can make and put on your farm, the better will be your farm. Our farmers are divided in their opinions as to taking care of it. A large number of them insist on drawing out the manure every day. None of the ammonia is lost if they draw it out. Other of the farmers think that it does not pay, and, consequently, they will stack it up in their barnyards and draw it out in the spring. Seventy-five per cent. of that manure is lost; it is hardly worth drawing out upon the farm. Some of our farmers think it pays them to feed, because the amount of manure they get pays for the feed. The quality of the manure pays for the feed used. We feed a great amount of bran. It makes milk, and cows feel very much better for having a good mess of bran than if they did not have it. Bran costs us twelve dollars per ton; we buy cornmeal for sixteen dollars per ton; new process oil-meal, we pay for that twenty-two dollars per ton; oil cake, twenty-six dollars per ton. The new process oil-meal has less of the oil than the old process. It contains more nutrition, so as to take the place of the old oil-meal. We have out there in Wisconsin an experimental station, where the food-value of corn-stalks has been tested by Prof. Henry. He delivered an address on the food-value of corn-stalks. They are beginning to take note of, and approve, the fact that there is nutrition in corn-stalks after they have been dried, and I think the time is coming when more of our farmers will use more than they do to-day. It does not pay us to raise hay when we can get more profit from our land by raising corn-stalks for feed. Now, to make one hundred pounds of butter: In feeding mixed hay, one thousand three hundred and forty-eight pounds hay, five hundred pounds cornmeal, seven hundred pounds wheat bran, one thousand one hundred and seventy-nine pounds clover, and five hundred and thirteen pounds corn-stalks. The bran ration was in excess of that of feeding corn-stalks, so that it is clearly demonstroted there is a food-value in corn-stalks. George P. Lord owns three hundred acres of land and one hundred cows, and has not put up a pound of hay in the last eight years. He feeds corn-stalks and oat straw. A cow can get along just as well on corn-stalks. Our farmers have been enabled to relieve their farms of mortgages, and if there are any mortgaged farms in this section of the country, there is nothing under the heavens that will raise a mortgage off of a farm quicker than a cow.

Some of our farmers have it arranged so that they can run the water right from the well along in front of the cows.

John Boyd said he found two cords of wood, when fed to the cows, ualed one ton of hay. He has a large stove in the barn, and puts at wood in the stove. As long as a cow is kept in her normal contion, she goes right along making milk.

We do use some ensilage. Prof. Roberts does not like it. Those of our farmers that use it feed it quite liberally. They fill their silos with corn, and this corn is the common southern corn. They cut it into about one and one and one half inch lengths, and weight it down. They take out in the morning a feed—what they want to feed in the morning. None of that acid or disagreeable flavor has been found in it. They have never had any trouble in regard to their butter; no difference in the price of their butter when they use ensilage. We must produce cheap feed, and we must feed a cow all she will eat. How many pounds of butter can I get off an acre of land? I think that it will probably make about eighty or perhaps ninety pounds to the acre. Whether there is any money in eighty pounds to the acre? if he can raise eighty pounds to the acre, he is making his farm pay him pretty well.

A large number of our creamerymen have placed separators in their factories. The milk is brought to the factory in the forenoon and run through the separator, running the separator at about seven thousand revolutions a minute. But by carefully examining the results, and testing skimmed milk, it was found to be worth about twenty cents a hundred, and according to Prof. Henry, separated milk is worth about twenty-five cents a hundred. The skimmed milk is run through the separator, and one little evil was, a gentleman was operating four or five creameries, and he discovered that although the milk receipts did not fall off any, but that the butter did, and they discovered that the milk was lacking in cream. One of the men had been mixing the skimmed milk with new milk. Now, this skimmed milk comes out in such perfect condition that by very little care it can be retained sweet. There is no injury to the milk. As to the quality of the butter, it will not stand the test, for the reason that this action of the separator must, of necessity, injure the cream globules. The butter would not be as good as the butter made from the cream raised in the old way, and I doubt whether it will keep as long as butter made by the old process.

The dairy farmers in our section of the country do not make any butter on the farm, but when you get a few miles beyond us, they do make butter on the farm.

When attending a dairy convention in the West, we always have good butter when we sit down to our meals. Gentlemen, if you expect to make good butter, you have got to improve your breed of dairymen. You cannot expect that a cow is going to give you milk, and you can make and sell such butter as I have seen in this place. Oleomargarine is worth ten times as much as the stuff here called butter. I do not know who make it, but I would think that they would be ashamed to look a cow in the face. I never had a shirt front as white as that butter.

A box of ensilage cannot smell as bad as it does. It lacks strength, but it will come to it

A great deal has been said about poor butter in the agricultural press, in dairymen's conventions, by merchants who sell it, and by people who eat it, and yet it is made, and I suppose will continue to be made so long as there are careless and shiftless farmers and farmers' wives in the country. They do not heed what is said, thinking, perhaps, that it makes little difference to them so long as they can sell their butter at any price, and that it will never pay them to care for the milk and cream, and feed and care for their cows as others do. Herein they make a fatal mistake. They should conduct their dairy business, however small it may be, on the theory that what is worth doing at all is worth doing well. It would surely pay the farmer to care for his milk and cream, and make butter that would not only be palatable to the consumer, but that would also be profitable to himself; and he should know that if his neighbor can make good butter, he can also. Many think it is a small thing, and leave the entire work of milking, caring for the cream, and churning to the women on the farm, and do not furnish them with convenient apparatus for the work. But how many of these men would dispense with a harvester, a sulky rake, a corn cultivator, or any other implement that will lighten their burden or expedite their work? Not very many, we imagine. Go into any commission merchants' place of business, and look over the farm dairy butter he has just received, and you cannot possibly find two packages alike, even from the same farm, if from separate churnings. This should not be so; it ought to be so nearly alike that it would be difficult for an expert to note the difference. Some of it is good, some indifferent, and some positively bad. No wonder artificial butter has been invented and is sold in such large quantities; as a rule, it is quite uniform, looks nice, and by nearly all is preferred to the horrible stuff made on the farms. Look at a dozen packages of farm butter, and you will see a dozen shades of color, from the immaculate white to the brick-dust red, and from the solid boring, grainy specimen to the salvy grease; some will be as salty as a last year's codfish, while others will be as free of salt as spring water. Some of it will be as streaked as Jacob's cattle, and possibly twice as strong. It is not necessary to use artificial coloring matter in butter. Every farmer can feed cornmeal and a few carrots, and the cows will do the rest; and it is generally conceded that white butter is unattractive to the eye, and consequently will be rejected by the consumer. Then why not make the butter so that it will please the eye and taste of the consumer, no matter what the views of the maker may be?

I have no means of knowing how much farm butter is made in the West, but will suppose it to be two hundred million pounds, the average net price of which will not exceed fifteen cents per pound.

Now, suppose the makers of this butter were to bestow a little more care on their cows and the milk and cream, and by so doing should increase the yearly average price from fifteen to twenty cents—and that is by no means an excessive increase—there would be added to the wealth of the farmers annually ten million dollars, a sum worthy the attention of each individual farmer. Then, too, the farmer should manage to have some of his cows come in in the fall of the year, and make butter, when he can do little other farm work, and when the price is double what it is in summer. The Elgin butter-makers, who for two weeks past have been receiving forty cents per pound for their butter, long since discovered that it paid them to feed and care for their cows, care for the milk and cream, and make the best butter that it was possible to make. No farmer in that section who is careless gets forty cents for his butter, but, then, there are very few careless ones there.

Let me draw a picture about the poor butter made on the farms, with the hope that those who see it, if they find themselves delineated in it, will at once try to improve their methods. Look at the picture: In a radius containing five hundred little farms, on churning-day five hundred women empty five hundred cream jars at five hundred temperatures into five hundred churns, and five hundred small boys are kept from school or other work to continue their hatred of the farm by five hundred hours of labor at those five hundred churns. Then the five hundred women work the five hundred lots of butter into five hundred little dabs, with five hundred different flavors, colored five hundred different shades of yellow, and sold at groceries at five hundred different prices, and yet butter-making does not pay. What is the sensible way of doing this work? Let the farmers come together and start a joint stock company, put up a creamery, with a good butter-maker, and two or three men to help him, and then let those five hundred lots of milk be brought to their factory, and be made into one kind of first-class butter, that sells as a uniform article at a uniform price; or, let each farmer resolve to secure cans in which to set the milk and cream, procure a good churn and a butter-worker, and learn how to make good butter that will command a good price. The creamery system we think the best, for the make of butter is uniform through the year, and the merchant who wants fifty or more tubs of butter at one time can get it all alike, and creamery butter sells in the fall, winter, and spring at from twenty-five to forty cents, while dairy butter made on the five hundred plan sells at from eight or ten cents to fifteen cents, rarely ever for more. By the creamery system, the farmer would receive from five dollars to ten dollars more for each cow, which would be that much more profit for him, and besides, he would be the instrumentality that will aid in freeing the markets of counterfeit butter. What an opportunity is offered to the farmers of the Western States to improve their condition financially! And the question is, will they embrace it? It is to be hoped that they will, and so put an end to poor butter, which is neither palatable nor profitable.

One result in the manufacture of this poor butter is the partial waste of milk; but if people are not addicted, however, to the use of fine butter, they can get along with this poor truck. But the farmer who makes it loses from five to ten cents per pound on every pound of the truck he markets, if he does market any. I do not know how many butter-makers there are in this hall, but it is in the power of any farmer who makes butter at all to improve his butter. Talk about improving the quality of cows! The very first thing is to improve the dairymen!

At the conclusion of Col. McGlincey's address, he stated that he was ready to answer questions upon the subjects on which he had spoken. The following discussion then took place:

A MEMBER. What temperature did you warm water in the winter?

Col. McGLINCEY. Just got the chill off; about fifty-five or sixty degrees. Mr. Boyd did water at eighty.

Q. What method of feeding dry corn-stalks do you use?

A. Corn taken off, and run through a feed-cutter.

Q. Do you stack the corn?

A. Some of our farmers stack the fodder; others put it in the barn.

Q. Is your creamery system conducted coöperatively or individually?

A. We have both systems in our creameries. With the exception of two or three, they are owned by individuals. Where an individual has gone into it, may be he is a farmer, and owns some cows. We have two or three very successful coöperative creameries.

Q. In the individual method, how does he produce it, and what price does he get?

A. One creamery near Elgin pays ninety cents per gallon, and where it is made up on the dividend plan, the factory makes up the butter or cheese, deducts the cost of making, and makes a division according to the amount received from each patron. Last year one of these coöperative creameries paid, I think, sixty-two dollars and twenty-five cents net, as the result of one gentleman's herd of cows, who delivered the milk to the coöperative creamery.

Q. How many months was that?

A. About eleven.

Q. In the cream-gathering system, what is the plan of averages?

A. The plan of averages, on the gathered-cream system, is for the creamerymen to pay from nine to ten cents an inch; a cubic inch of cream makes a pound of butter.

Prof. ROBERTS. What is the diameter of the can used?

Col. McGLINCEY. Uniform; the Fairland can was a patent can holding one hundred cubic inches, and from which we expected to get one hundred pounds of butter.

A MEMBER. Is there any discrimination in prices?

Col. McGLINCEY. There is no discrimination in price; butter sells at forty cents per pound.

Q. Is there any discrimination between Jersey and Holstein butter?

A. No, sir; we have some few gentlemen there who own Jersey cows. We have a little of everything—very largely Holstein. There are perhaps twelve or fifteen hundred full-blooded Holstein cattle. We have been using Holstein cattle ever since 1874. I think it was in 1874 the first Holstein cattle were brought there.

Mr. HAZARD. How much is the general average per hundred for the milk?

Col. McGLINCEY. The general average—I should judge that the general average for the year 1885 would be—we got about four and one half pounds of butter from one hundred pounds of milk. That four cents per pound includes everything. The milk is delivered at the factory, and the factorymen find the machine, the coal, the salt, and the coloring matter. Everything on the butter is paid by this four cents per pound.

Q. What kind of tubs do you use?

A. We use the ash tub, wooden head and slide cover.

Q. Is there any print butter shipped from your factories?

A. There is a great deal of butter made in the city of Chicago, and shipped to New York and Philadelphia, and it is printed to come from where Hiram Smith lives, and they steal off the brands. If there are any print-brands come from that section of the country I do not know.

Q. Do you mix the night's milk with the morning's milk?

A. The night's milk is well cared for. In the summer time it is thoroughly cooled, placed in the milk-house, and kept there ready for delivery in the morning,and it is not mixed with the morning's milk. In the winter time we have to look out that we do not freeze the milk. We cover the cans with blankets to keep it from freezing.

Q. Does not the carrying of the milk to the factory have some effect on the butter?

A. I said in the outset it was only my impression. I reasoned from the fact that the more jarring there is to milk, the more working there is to milk, that the butter would not have the keeping qualities.

Q. Is it practicable to work the butter over after being packed in the tub?

A. After the butter has been worked and packed in the sixty-pound tubs, I do not think it would be practicable to work it again.

Q. Do you work your butter over twice?

A. In this we disagree. Some of our creamerymen work their butter over twice, but the majority do not.

Dr. RANKIN. Would you be willing to answer a question that would test your quality on taste. Is the butter you are making as good as that you have been eating for a day or two?

Mr. PERRY. In the test that you mention of having taken place by Prof. Henry, of the amount of feed, did you reduce that feed to dollars and cents?

Col. MCGLINCEY. No, sir; but he gave the farmers to understand that there was a food-value to their farm products. Prof. Henry has figured out the cost of producing corn-stalks, &c.

Mr. PERRIN. What is the best breed of cows for the farm?

Col. MCGLINCEY. The only test that I know, and it is not fair to state it here, is one made by Dr. Teft. The gentleman was attending a farmers' institute, and the question was asked which was the best breed of cows for the farm. One said the Jersey, another, the Guernsey, and another, the Holstein. He took one hundred gallons of milk from a Holstein, and sold it at ten cents per gallon. He kept a very accurate record of what it cost him to keep the cow, and the Jersey had to back water. This matter of testing these cows has not been done satisfactorily as yet. We want to get ten or twenty thousand dollars for the purpose of establishing an experimental station. Let us get a test as to which is really the best cow. I know that the Jerseys have the reputation of being good butter cows, and so have the Shorthorns and Devons.

Mr. MAGAW. Now, I am not an advocate of skimmed cheese, and I would like to know your opinion of it.

Col. McGLINCEY. The gentleman asks me about skimmed cheese. If I had an enemy in this world, and I wanted to get him out of existence, P. D. Q., I would give him skimmed cheese. Senator Cullum said to me that the manufacture of fraudulent butter was a damnable outrage; I say that the manufacture of skimmed cheese is a damnable outrage. There is nothing in skimmed cheese but indigestion Some men attempted to use buttermilk in cheese. One said, "You have got all the butter-fat out of that milk; let's run in about one hundred or one hundred and fifty pounds of buttermilk." Well, they tried it, but they did not sell the cheese quick enough—the buttermilk began to work, and there was an explosion. I would say to the dairymen of Pennsylvania, if you are going to make butter, make it good; if you are going to make cheese, make full cream cheese. Do not attempt to do what has been done in Ohio and Illinois. Do not attempt to make butter and cheese from the same milk. Ohio once had a good reputation for cheese. Last year, for 1885, there were thousands of pounds of cheese reported to be sold by our manufacturers; they received two cents per pound for manufacturing, and that cheese was sold in Chicago for one and three fourths cents per pound. Do not make skimmed cheese—it is an abomination in the eyes of all right-minded people. Now there was a time when we used to make a good deal of money out of skimmed cheese. If we had had this skimmed cheese during the Rebellion, we might have settled the Rebellion a good deal quicker. The people like cheese, and when they go into a store to buy it they do not want to get this white-oak cheese. Now let me say that our butter is marketed immediately, and goes immediately into consumption.

Mr. LEWIS. Do you not think that the feeding of grain improves the milk?

Col. McGLINCEY. Certainly it does.

President FULLER. As we announced this morning, owing to the absence of Dr. Sturtevant, the Hon. L. C. Beach will address us this afternoon instead of this evening.

The following able address was then listened to from the Hon. L. C. Beach, of Meadville, on

THE INS AND OUTS OF LEGISLATION.

One who enters a legislative hall as a member for the first term is amused and astonished. His ideas of how legislative bodies are managed, and how certain bills are passed, and how others are defeated, must necessarily change in a little experience at the capitol.

The first thing to be done, of course, is to organize. It is necessary to be present a few days before the opening of the session, especially if you belong to the majority part, to help select the officers and appoint men to fill the minor positions.

Now, when you arrive you will find that the responsibilities resting upon you, which you thought were great, are quite small. You will feel greatly relieved. There will be a man or two who will kindly tell you just what to do. You can do it or not, it does not make much difference to him or you. You may have had an idea of what you thought ought to be done, but if it does not agree with the plans of the one or two mentioned, you will find yourself in the minority of the majority. The truth is the members do not select the principal officers. Those men who are to rule over you are selected, as a general thing, by men entirely outside the body. It may be humiliating to you, but you are allowed the glorious privilege of voting just as some one wants you to vote. The procession moves right along. You can join it, or stand and look at it, but the procession moves.

You know our legislative bodies are composed of representatives of the people. This is, as a general thing, a mistaken idea of the people.

I honestly believe that a majority of members of the legislative bodies of the different States is controlled by a few men called leaders and great corporate bodies.

I am sorry to say this, but facts demonstrate the truth of the statement. Take the great questions that come before the different legislative bodies in this country and see how difficult it is to get such legislation as the people desire. Nothing but a cyclone can clear the atmosphere in some sections, and nothing but a people aroused in holy anger can make an ordinary legislative body do its whole duty.

It ought to be thoroughly disgusting to have a slick, oily-tongued smart fellow following up members and making promises like the devil made to Christ upon the mountain, if they will only fall down and worship him; and it beats the devil—and this is said in no slang phrase—how the lobbyists do their work. Too many legislators are slaves, not black ones, but poor whites, living on the yellow clay of promises and small positions, enjoying no liberty at all. As a rule, the caucusses which are held might as well not be held at all. Everything is arranged for you. Everybody is nobody. One or two men are everybody.

I do not now call to my mind one important bill that was strongly opposed by any great interest in the State that passed last winter in our Legislature, except one, and that one was commonly called the hygiene bill. That bill passed by the force of the temperance women of the State. The bill may not have been just what it ought to have been, but in the main it was a good bill. It was passed by overwhelming the members with petitions. Men who wanted the bill defeated were afraid to vote against it because their thousands of constituents had their handwriting on their desks. It is really astonishing that any man representing any constituency in any part of this Commonwealth would have the hardihood to put himself on record as opposing the introduction of such a study in the public schools. Yet men did it, and did it with all the force they had. It would seem as though any man would be glad to have his child grow up with a full knowledge of the effects of intoxicating liquors upon his constitution, even if he were a distiller, or brewer, or wholesale or retail dealer. The liquor manufacturers and dealers opposed this bill through their representatives in every way, evidently because they were afraid of the effect of such instruction upon the young.

Certain members undertook to laugh it down as a bill gotten up by a woman; others said that the work would teach children that the use of intoxicating liquors was injurious, while the parents of these same children were manufacturing or selling it for a living, and constantly using it in their homes, which would make the children believe the books were teaching lies or that the parents were old sinners. Every reason urged against the passage of the bill was as flimsy as cheesecloth. The women stood their ground, and the bill became a law.

A high-license bill could have been passed in the same way, but the men and the women, and especially the women, did not come to the rescue. How the old bald-headed fellows, and those who are not bald-headed, who are owned by the liquor interests, and are kept in the Legislature by the same interests, look daggers when the women strike for reform in that direction! They smile to the ladies' faces, but they go out around the capitol, or down to the hotel, and swear that they wish the women would keep their places. They have no business hanging around the Legislature! It's a man's place, not a woman's!

It's real fun when women come marching up in some good cause in a lady-like way to see the cowards run and dodge. A man is more afraid of a woman than of a man.

If women can't vote or sit in our Legislature as members, they can be a mighty power if they will properly use the influence they have.

It was "Uncle Tom's Cabin," written by a woman, that made the emancipation proclamation, written by a man, possible at so early a day.

A strong effort was made last winter to pass what was called the anti-gambling bill—House bill No. 33.

I believe there was more than a majority of the House that wanted to see that bill pass, but it failed because of the combined efforts of speculators of all kinds, the domination of party, and cowardice. Poor, miserable gamblers in stock all over the State kept the wires busy begging members not to support the bill, for their business would be ruined if the bill passed—the best reason in the world for supporting the measure. I know of one member who received a telegram from a young lady relative, pleading with him not to support the bill on account of her friendship for an oil speculator. Here is a case where a woman's influence in legislation was on the wrong side. I do not think she knew what she was asking her relative to do. In all probability, such a law would be the best thing for her friend and herself. She would not see the misery, insanity, and death that strike hundreds of homes every year through this gambling in stocks. Could she but look into the future, she might see her friend dying in poverty, and herself on the road to the poor-house. We who supported that bill were told we had no right to enact such legislation. Well, may be we hadn't, but we caused a good deal of bellowing and growling among the bulls and bears in the speculating menagerie of the State.

The anti-discrimination bill got nearly all its strength from the people behind the members. Had not the people given their representatives to understand that it would not be safe for them to vote against that bill, it would have been almost lost sight of. The smoothness with which railroad officials and their friends oppose such a measure puts one in mind of lubricating oil of the finest quality. Here is a fine fellow, who has been accommodating members and their families with passes over the railroad which he represents all winter, who is very gentlemanly and kind, comes to Joe Brown and says, "Joe, I want you, when such a bill (naming the anti-discrimination bill) is called up, to oppose it. You will please do this for me; it will be a great favor." Well, Joe has been favored, and he agrees to do as requested. This is just one string that is pulled: there are a thousand and one ways by which such a bill is defeated.

The farmers complain because they are not more successful in getting such legislation as they desire. It may be they get all they are entitled to, and it may be they do not. I believe there are a great many good men from the farms who could properly represent the agricultural and all other interests in the State, but I do not know that they are much more reliable than men of other occupations.

A bill was presented last winter in the House at the request of the Pennsylvania State Dairymen's Association to establish an agricultural experiment station. The station was to be located at some point in the State of easy access by railroad, and to be fixed by a commission named in the bill. That bill was smothered in the committee, and another reported affirmatively very like the former except that it located the station at the Agricultural College in Centre county. It was useless to pass such a bill as had been reported, for one similar to it had been passed in 1883, and the Governor had vetoed it, and gave good reasons for so doing. But the friends of the College were determined to pass such a bill or none. They did pass it, and the Governor vetoed it, as they knew he would. Hence the State is cheated out of an experiment station for some time to come. Interest in the Agricultural College beyond the general welfare of the farming interest of the State, and political power, did the work.

The men on that agricultural committee succumbed to outside influences, and the genuine farmers of their respective districts ought to mark them for all time to come.

It is due to the gentleman who was so prominently put before the people of this county as the farmers' candidate, to say that in no case do I recollect wherein he deserted their best interests. But, unfortunately, while he belonged to the majority party, he was in the minority in the committee on agriculture when it became a question between the people and the politicians.

The best man to elect as a member of the Legislature is a deaf and dumb man. I did not see one there last winter, but I often wished some of them had been. I think the people do not fully understand the make-up of a first-class legislator, or they would elect a deaf and dumb man every time they could get him.

In the first place, at least half the session is lost in useless talk. The one who talks the most accomplishes the least. Hence I conclude if he couldn't talk at all he would accomplish more than a talker.

In the second place, if he couldn't hear he would not be bothered with foolish speeches, nor lobbyists. These lobbyists are the ones who cause the passage of bad bills and the defeat of good ones. Give us deaf and dumb representatives. You may claim you have had enough dumb ones in the past, but they have not been dumb in the sense I mean. We need more work and less talk.

It was said by one of our greatest legislators, when he became disgusted at the weakness of some of the men who were associated with him, that, according to the investigations of scientific men, there had been a time in the world's history when there were animals that were brainless vertebrates, but the time had now come when there were other animals that were vertebrateless brains.

Give us more backbone in our legislative halls, more courage, more strength.

One great danger in legislation is that representatives will do the bidding of their party, even against the dictates of their conscience.

The highest court that ever sat in this country was the Electoral Commission which had to settle the question of the presidency between Hayes and Tilden. It settled the question and humiliated the great American Republic—not because it decided in favor of Hayes and against Tilden, but because no man on that commission could see beyond his party, not even a judge of the Supreme Court of the United States.

To be sure, these men were not sitting as judges of the Supreme Court at the time, but their votes demonstrated that even men in their high places are controlled by party prejudices and party power.

When Andrew Johnson was sought to be impeached, nothing saved him and the nation from shame except the votes of men who were above party feeling.

In closing, I do not want to leave a wrong impression on your minds. I have given you much of the worst side of legislation. I now wish to say that there are many members in all legislative bodies who are true to their State, their constituents, and themselves.

Men are too often influenced in the ways I have mentioned, but altogether too many people are under the impression that money is used to influence members in their actions. Legislators are very much like the people whom they represent. They are getting better as time rolls on, and the day will sometime come when no man can stand up and point out the faults which we find to-day.

Mr. Beach's address led to an animated discussion, which was participated in by Prof. Roberts, W. P. Hazard, L. C. Beach, S. C. Sibley, and others.

Adjourned to meet at 7.30, P. M.

EVENING SESSION.

This session was devoted wholly to a lecture by Mr. Will B. Powell, of the noted firm of Powell Brothers, proprietors of the Shadeland State Farm, at Springboro', Pa. The subject was "The Susceptibility of the Horse and other Animals to the Influences of Climate, Soil, Development, and Breeding."

The delivery of this lecture covered two hours of time, and was most attentively listened to by a large and cultured audience. By special invitation, Mr. Powell has since delivered the lecture in various parts of the country, but it has not yet been given to the public in print. The following synopsis of it, published in the *Pennsylvania Farmer*, soon after its delivery in Meadville, is said by Mr. Powell to be the most concise and comprehensive review of it yet published.

SYNOPSIS OF MR. POWELL'S LECTURE.

The lecture comprises history, science, extensive observation, and a large amount of good thought and common sense. It explains those causes which have produced the mammoth Clydesdale and the diminutive Shetland pony. It recites the history of the horse, and the great value in which he has been held by all classes of all ages from the earliest history to the present time. It pictures, in touching terms, his usefulness on august and solemn occasions; then gently and beautifully transports the audience to the quiet scenes of the lovers' moonlight ride, in shady lane and flowery drive, where the faithful animal's gait is obediently tempered to exactly suit the requirements of the occasion; then again to the field of carnage and death, where the horse's bold and daring characteristics are proven. It shows how the influences indicated in the theme have produced the pondrous, slow-gaited, shaggy-legged, heavy-coated Clyde, the rat-tailed, thin-haired Arabian, the Mustang pony, the rattle-brained racer, and, in fact, every known variety of horse kind. Nor does it dwell solely upon the horse. It embraces many other animals, and tells what has produced the Spitz dog, the New Foundland, the English mastiff, the pointer, the grayhound, and bloodhound. It also shows clearly what has produced the marked characteristics of the bovine race; the keen eye and lithe form of the Jersey; the small-horned, light-boned beef-breeds; the heavy-limbed, muscular, large-horned Texan. It shows why the skins of otters, caught on the Chattahoochie river, are worth but fifty cents, while skins from precisely the same kind of animals caught in Canada are worth ten to fifteen dollars.

Digressing from the lower races of animal kind, it grasps the principles involved in the human family, and shows that the cool, damp climate of Scotland has produced the light-haired, fair-skinned, even-tempered Scots, while the storm-surged climate across the channel has given us the hardy-skinned, high-strung, irritable Irishman, who is a friend to-day and a foe to-morrow; how the climate of all countries has wielded its power in shaping the peculiarities and characteristics of all nationalities, and clearly shows how and why Scotland's cool, moist climate has produced blond complexions, light hair, and blue eyes, while Africa's scorched and burning climate has curled the hair, thickened the scalp, blackened the skin, and dulled the sensibilities of the African race; and it touches the various races, complexions, and characteristics between those two extremes, showing clearly how the influences noted may have produced all races and classes from one common origin.

Leaving the theme of climate and its influences, the lecturer discusses the influences of the product of the soil upon the structure and characteristics of mankind, as well as upon the lower animals. The product of the low lands of Scotland produces a different bone and muscle from the hot, dry soil of Arabia, hence the difference in structure of the people of those countries. The effects of the product of the soil of each country is shown in its people in proportion as the soil differs. The product of the new land tends to impart energy and endurance to people and animals alike, while, as the soil of a country deteriorates, the people degenerate. Tall races of men have grown upon the food produced on soil that gave tall forest trees, while those countries where the forests are low, have given a class of people low in stature. The effects of food are nowhere more plainly shown than in the fact that, for twenty-eight years, the Derby was won by horses fed upon boiled beans.

Leaving the theme of soil, that of development is taken up and discussed in such clear terms, from the beginning of history down to the present time, such proofs cited, and the results substantiated by so many and such forcible living illustrations, that the dullest mind cannot fail to gain volumes of information on that important point. The effect of development is seen in the superior strength of the wood of a tree grown on a hill, subjected to continual blasts and trying winds, over that grown in a gulch, where no wind disturbs it; in the domesticated animals, where characteristics of their wild life have disappeared, and in the sturdy, energetic go-aheaditiveness of the man or woman who has risen to success against opposition of divers kinds, over that of the one who has come up on the rocking-chair of ease and luxury. Thus, all the important features comprising the subject are handled in a most able manner, but we have not the space to go into detail as we would like to do, and can only give the faintest outline of this most instructive and entertaining lecture. No one can comprehend it without hearing it delivered, and we are glad to note the indications that it will be delivered before many learned audiences. This week, Mr. Powell delivers it at Cornell University, and has already received several other urgent invitations to go before important assemblages with it.

In the audience here were many able critics, nearly all of whom we have heard express themselves in the most favorable and appreciative terms. Every one was delighted, entertained, and benefited.

There have been many expressions of surprise at the wonderful success of the lecturer in holding so firmly the attention of his audience through so lengthy a discourse. The secret of that is found, not alone in the lecturer's pleasant and entertaining manner of delivery, but is due to the combination of that essential feature with the fact that the lecture teems with newness and grandeur of thought and rare information from beginning to finish. It seems hardly possible that an intelligent audience could become weary while being led through such an enchanting field, prolific with valuable and ennobling information. The audience is seemingly carried with the train of thought advanced into every part of the world, from lands of perpetual flowers to darksome Egypt and Africa, the sandy deserts of Arabia, the New Jerusalem, the ruins of Jericho, the Valley of Jehoshaphat, the Garden of Gethsemane; to Damascus and to Mount Moriah, where more than three thousand years ago Abraham offered up Isaac. Indeed, it is not strange that the attention of an audience seeking after knowledge should be and is more closely and intently held as the end of so rich and rare a feast of good things draws near.

THURSDAY MORNING SESSION.

Meeting called to order by President **FULLER** at 9.30, A. M.

Report of Committee on Dairy Utensils received and accepted.

President **FULLER** then stated that Hon. R. L. Cochran, of Franklin, Pa., was present, and would address the Association. Subject, "Matters of Importance to Every Farmer."

Mr. **COCHRAN** spoke at considerable length of the great importance to every farmer of being thoroughly familiar with the subjects of finance, taxation, and legislation as they relate to him, and what means should be taken by farmers to best secure the carrying out of the laws which particularly relate to them. An interesting discussion followed the address of Mr. Cochran.

President **FULLER**. We are indebted to Mr. Cochran for a very pleasing address. We will now listen to the reading of a paper by Dr. C. C. McLean, of Meadville, Pa., who should have spoken yesterday. Subject, "Veterinary Surgery."

Dr. McLean's address gave evidence of much study in its preparation. It being written, the stenographer did not take it as delivered; hence, the Secretary is unable to present it in this report.

The next address was by Hon. William Gates, member of the State

Board of Agriculture from Venango county. As it was understood that the same address would appear in another department of the agricultural report, in connection with proceedings of the State Board meeting, it is omitted from this report.

MARKETING FARM DAIRY BUTTER.

MR. PRESIDENT AND GENTLEMEN OF THE ASSOCIATION: My experience in the coöperative marketing of farm dairy butter leads me to the conclusion that for successfully carrying on such business, the farmers should establish local organizations at their different trade centers, then make arrangements with some one man to receive and make payments on the butter, and attend to the sale and shipments of the same. They should all adopt some one of the many good systems of setting the milk, now in use by the large creameries, say the Cooley or Fairland system. They should all use the same kind of churn, say the Davis, the Acme, or any of the concussion churns. The cream should all be churned at a uniform temperature, and the buttermilk drawn at the granular stage of the butter, and the butter be thoroughly washed and put into jars, unsalted and protected from the air, and delivered to the salesman, or worker, on a certain day of each week, all delivering on the same day, that the salesman may work and salt at one time full packages of a uniform grade and color, after which it should be shipped to market immediately, or put into refrigerators for later use.

Arrangements should be made whereby a certain fixed price should be paid for the butter, according to the grade, the day it is received. The price should be adjusted at the beginning of each month. After the legitimate expenses for the month or quarter are taken out of the surplus receipts, the balance to be divided between the producers in proportion to the value of the butter furnished the association.

As to marketing the butter, let two or more local organizations combine, and put a salesman of their own in some good market for the sale of the butter. Keep the title of the butter in the name of the producer until it reaches the hands of the consumer, thereby bringing the cost of transferring from producer to consumer to the least possible cost consistent with the proper transfer.

The point I wish to make is, that the farmers themselves will have to organize, assume the risk and responsibilities, and share the profits, if any, in the transaction, as it is to the producer the profits rightly belong. I believe a penny saved in this way is just as legitimate as any money made upon the farm, and it is just as important to market your products properly as it is to produce them properly. It might be just as essential to turn a part of our attention in this direction as to concentrate all our energies towards so large a production. We might, at least, in this way stop the cry we have heard so much of late of over-production.

Again, it is said it takes the farmers a long time to catch on to any new requirements of the market; but if they had their own men in the markets, and responsible to the producer, they would almost instantly learn of any new requirements of the market.

I venture the assertion, that if there were a few of such organizations in the markets at the present time, the laws now in force in regard to oleomargarine would be better enforced than they now are, for the reason that the person most injured by the sale of oleomargarine and butterine is the farmer; but they being in an unorganized state, it will not pay any one farmer to see the laws enforced, while if they were organized it would pay them to enforce the laws.

We now see dealers selling both genuine and bogus butter at the same time, and as the profits are as much on the sale of the bogus as on the genuine, the dealers have no direct interest in the enforcement of the laws. The only efficient way I see at present is for the farmers themselves to organize, and fight their own battles for their own profit and protection.

These organizations should be effected according to law, and I find, upon investigation, that Pennsylvania law No. 62, of 1868, covers the ground nicely.

President FULLER. Is there any questions you would like to have brought up now? Col. McGlincey is a well of information, and I have no doubt will be glad to answer questions.

Mr. SPITTLER. I would like to ask Col. McGlincey whether that poor butter he had was poor Jersey butter?

Col. McGLINCEY. I want to say that I have eaten some remarkably fine Jersey butter. I hope that the people do not understand me to say that they cannot make good butter here in Crawford county, because they can. A little more care taken of the milk and cream, in the manufacture of this butter, will improve the quality of this butter a great deal. The butter was without grain, smooth and sandy, almost like lard. If the butter had not been worked to death, it would have shown grain. I speak of this butter from my stand-point, and my stand-point may be a higher one than yours. The butter that I handle I must say is superior—not because it is made where I live, for a large quantity of the butter that I handle is made farther west. I used to live on a farm when I was a boy, and I thought my mother made the best butter in the world. I am manufacturing an article in which I have no interest whatever only for the money I get out of it. One trouble with butter-makers on the farm is that they have not the facilities for caring for the butter. They permit the cream to stand too long. Cream that has become old is leathery on the top; that leathery portion of it is where the casein has separated from the milk and gone into the cream. When it has reached that stage it will not assimilate with the butter, and you have got your white specks in the butter. Cream should not be allowed to stand until it becomes too acid, and it should be churned at proper temperature. Cream should be churned in winter time at sixty-two degrees; in summer time, reduce the temperature a little, say fifty-eight degrees; in summer and winter from fifty-six to sixty-four degrees.

A MEMBER. How long should milk be churned?

Col. McGLINCEY. There is a variation in churning. Some milk can be churned, and all the butter can be obtained in twenty-five minutes. When the butter is in a granulated form, as large as wheat kernels, stop the churn.

Q. What is the best way of salting butter?

Col. McGLINCEY. Make a brine that you can taste the salt, pour that into your churn, and give it one or two revolutions; draw that off and put in another pail of water without any salt; give it a few more revolutions, draw it off and take out your butter. Do not let it swim in the water; work it as little as possible, salt it on the butter-worker, one ounce of salt to the pound.

Q. What salt do you consider the best for butter?

Col. McGLINCEY. I am not a salt man, I do not sell salt. In the manufacture of butter it costs a small trifle for salt, and the salt you use will add from three to five cents per pound to the price of the butter when it reaches the market.

Q. Does it add to the keeping qualities of the butter?

Col. McGLINCEY. A great many people say no. I do not know. I am of the opinion that the time will come when our butter will be prepared for the market without salt, and salted when it goes on the table. I once dined with an English family, and they had no salt on the table. I had been accustomed to the use of salt, while they had not. It was a matter of taste to them—they did not use salt in their meats unless they wanted to preserve them.

Q. Does salt add to the weight of the butter?

Col. McGLINCEY. Of course if you add one ounce of salt it will add one ounce in weight, but the less you work the butter the better it is for your butter. A great many men state that within the next three to five years the butter made in the United States will be marketed without salt.

Q. Do you ever salt your butter in the churn?

Col. McGLINCEY. If we were making a small quantity of butter, it might be salted in the churn.

Q. How can you get all of the buttermilk out of the butter?

Col. McGLINCEY. You can get all the buttermilk out of the butter if you will place all of the brine in the churn, and give it two or three revolutions.

Q. What is the most practicable churn for the farm?

Col. McGLINCEY. Curtis's square-box churn is used largely in the factories in the West. Some recommend the rectangular churn for the farm, manufactured by the same firm. There has been numerous discussions on the churn. There are those people who adhere to the old dash churn; there are those who believe in the Davis and barrel churn. Perhaps three fourths of the factorymen and dairymen in the Western States use the Curtis. Not being a dealer in any of those implements, I am only giving my own individual views.

Q. What causes bitterness in milk?

Col. McGLINCEY. We discovered that a plant growing in the pasture, called ragweed, was the cause of the milk being bitter. In calling the roll for the month, I found that in the summer, in the month of August, more farmers said that their milk was bitter than in any other month in the year. That ragweed will make the milk bitter, and the butter bitter.

Mr. SPITTLER. I would like to ask you whether you think the temperature had anything to do with the specks in the butter?

Col. McGLINCEY. Yes, sir; the casein is what produces the white specks.

Mr. SPITTLER. If cream is in a draft, will it cause a dry crust to form over it?

Col. McGLINCEY. A draft will cause that leathery substance to form over it.

A MEMBER. Will that ever occur in the submerged system?

Col. McGLINCEY. If you submerge your milk, and keep your cream submerged, I do not think that you will find that leathery substance there.

Q. Can the bitterness be removed from the butter?

Col. McGLINCEY. You cannot remove the bitterness from the butter.

Q. Will the feeding of ensilage have any effect on the butter?

Col. McGLINCEY. I do not know anything about this ensilage, I only saw this sample here. My impression would be that the corn was cut a little too green.

Q. I would like to ask how we will get the most money out of our dairy—whether from the creamery or making cheese—which gives the best satisfaction?

Col. McGLINCEY. In Wisconsin they manufacture full cream cheese, and seem to be pretty well satisfied. Our people manufacture butter, and they seem to be satisfied. A very small quantity of full cream cheese is made in the State, and this last year we did not make very much skimmed cheese. In Wisconsin, they carry on the plan they do in New York State. They run six or seven months in the year, while we run twelve. Our people get better results from their dairy for the reason that we are producing butter when it is a high price. In the summer, it sold as low as fifteen cents per pound; since October, thirty to forty cents; for the last three or four weeks, thirty-three cents per pound.

Q. Do you think the farmers get more for the money invested—that is, in the winter and summer dairying?

Col. McGLINCEY. Yes, sir.

Q. When do you cut your hay?

Col. McGLINCEY. Generally, the hay is cut just before the blossom begins to down. We cut in the forenoon, and frequently get the hay in in the afternoon. We use a tedder. Then again, if you cut your hay a little late in the season, the better part of the hay is lost to you. Sometimes it heats; then we sprinkle a little salt over it. Lime is not very good on account of the dust. Some of our farmers cut when it begins to blossom. Hiram Smith takes in three crops of hay in a season.

Q. Do you cut your hay and get it in the same day?

Col. McGLINCEY. Cut it after the dew is off in the morning, then you stir it up with your tedder, and it will dry out wonderfully before the dampness begins to appear in the atmosphere. We do not cock it up and haul it in the same day.

Q. Does it not heat in the barn?

Col. McGLINCEY. Our farmers do not think the heating injures the hay. We sprinkle a few handsfull of salt over the layers when we put it in the barn. We believe in giving our cattle all the salt they can use.

Q. Do you put your hay in tight barns?

Col. McGLINCEY. We put our hay in the same barns with our cattle. We have tight barns—lumber is cheaper than feed. Hay must not be put in too green. A farmer in Wisconsin hurried his hay in green and it heated, and came mighty near setting the barn on fire, but he said the cattle relished it very much, and that he thought he was the first man in the State that prepared ensilage. In the summer season our farmers feed green corn. Nearly every farmer grows a patch of sugar corn. It keeps up the flow of milk, and it is a very good diet for the cow.

Q. Do you feed your cows in the pasture?

Col. McGLINCEY. Well, we do not feed our cows in the pasture except when we are feeding pumpkins.

Q. Do you feed the seeds of the pumpkins?

Col. McGLINCEY. We do feed the seeds. You have got an advantage over us in the timber. Shade in the pasture is a great advantage. Some of our farmers think it is an injury on account of the flies. There were several cases of sunstroke of cows standing out in the sun last summer on the prairies where there was no shade. For humane purposes every farmer should have shade in his pasture.

Q. Do you ever use the caps on your hay?

Col. McGLINCEY. I have never seen any of these caps used in covering hay. I have seen them in the Minnesota wheat-fields.

Mr. ODELL. In the region of country where Col. McGlincey resides, hay-caps are not so much needed as they are here.

Col. McGLINCEY. In Minnesota they have sudden showers, and they sometimes let their wheat stand out for several months.

A MEMBER. Do you feed your corn-meal before you feed hay?

Col. McGLINCEY. We feed cornmeal before we feed hay. In the winter-time our cows are in the barn all day, with the exception of about two hours when there is a sun. Some of our farmers believe it is policy to feed while they are milking.

Q. At what time of the day do you water your cattle?

Col. McGLINCEY. In the winter-time we want to water our stock about ten, A. M. If it is very cold, we do not water them before noon.

Q. Do you wet your cornmeal before feeding?

Col. McGLINCEY. One of our farmers said he never would feed cornmeal and bran dry. Some of our people do not believe in that.

Q. Do you ever grind your corn on the cobs?

Col. McGLINCEY. Sometimes we grind the cobs with our corn. Some of our farmers grind the corn and cobs and feed them together. There is considerable potash in cobs. They had better burn the cobs and give the cows the ashes.

Mr. SHIPPEN. I have been paying attention to this question of corn-cobs. I find that the different agricultural institutions of the different States have been analyzing the subject of corn-cobs. They are very nearly equal to the same weight of hay. In throwing corn-cobs away, you are losing twelve bushels of corn in every hundred.

Mr. JOHN FULLER. There is a certain woody fiber that will not grind, and little sharp particles there that will not grind.

Mr. SHIPPEN. I grind my corn-cobs very fine, and have had no trouble. I have been feeding for several years the ground corn and cobs together. I want to grind my corn, cob and all, every time.

Col. McGLINCEY. I have been answering questions for some time, and would like to ask some myself. I would like to know something about this question of abortion. Do you have many cases of abortion in this section of the country?

Several gentlemen stated that they had one or two cases in from fifteen to twenty years.

Mr. JOHN FULLER said that he thought the reasons for it were that the cows were kept too closely confined and too warm in the stable, and then let out in the cold air.

Col. McGLINCEY. Eight or ten years ago we had a great deal of abortion in the West, but for the last four or five years we have had very little of it. There may be a variety of causes. Frightening an animal may produce abortion. Some veterinary surgeons lay it to high feeding. Are you troubled to any great extent with milk fever?

Mr. ODELL. There was a good deal of trouble with it in the city last winter, more in proportion than in the country.

Col. McGLINCEY. How much do you get out of your cows here?

A MEMBER. About one pound of butter a day.

Col. McGLINCEY. The average butter yield in the United States is about seventy-five pounds. By feeding and caring for the cows we should be able to increase the yield and average from one hundred and twenty-five to two hundred and twenty-five pounds. I do not believe it would require ten years to do it, and the same time increase the quality of the butter. I would sooner have quality than quantity. Our farmers milk about ten or eleven months, and the cows are dry about six or eight weeks. We will take, for instance, a man that has a herd of sixty cows, and he endeavors to have the majority of his herd to come in in the fall—in December say—so as to have more butter when the price is high. I should think it would pay for all the saloon-keepers to keep buttermilk. In the larger cities there has been created a great demand for buttermilk and skimmed milk. Now, in relation to the cream, it is not every man that can drink cream. A man that might try milk would not want to try cream.

A gentleman stated that, discovering a sharp, bitter taste in cream brought to the factory, upon tracing it back discovered that the cows had been eating horse sorrel.

Col. McGLINCEY. I am very much obliged to you gentlemen for the attention you have given me, and I trust that in the future I may be with you again.

Meeting adjourned *sine die.*

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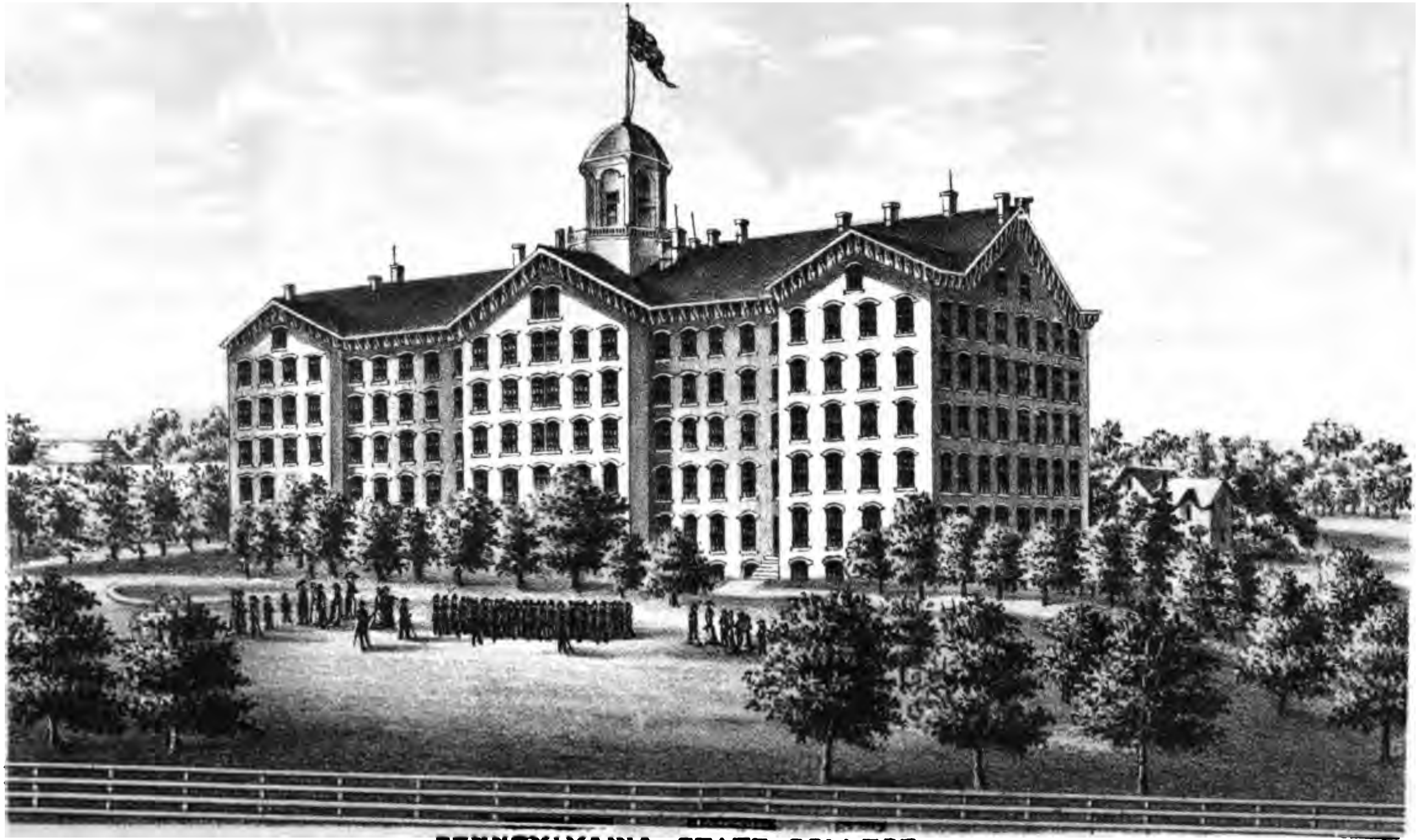

PENNSYLVANIA STATE COLLEGE.

LEGISLATIVE DOCUMENT, No. 5.

ANNUAL REPORT

OF THE

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FOR THE YEAR 1886.

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DESCRIPTION OF THE INSTITUTION.

The Pennsylvania State College

Was organized in 1859 as the "Farmers' High School," and its object then was to give an exclusively agricultural education. Its organization, however, was upon a collegiate basis from the beginning; and its name was, in 1862, changed to "The Agricultural College of Pennsylvania." Subsequently, the Legislature of the State having appropriated to this institution the income from the proceeds of the National land-grant, and the scope of its work having thus been necessarily enlarged, its name was, in 1874, again changed, and it has since been known as "The Pennsylvania State College." This name is considered to have peculiar fitness, both on account of the intimate connection of the College with the State Government and because the benefits of the National endowment were designed and are administered in behalf of the people of the whole Commonwealth.

The scope of the institution, as now organized, cannot be better stated than in the comprehensive words of the act of Congress itself, defining the duty of this and similar colleges:

"The leading object shall be, without excluding other Scientific and Classical Studies, and including Military Tactics, to teach such branches of learning as are related to Agriculture and the Mechanic Arts in such manner as the Legislature of the State may prescribe, *in order to promote the liberal and practical education* of the Industrial Classes *in the several pursuits and professions in life.*"

This act of Congress was, in 1863, "accepted by the State of Pennsylvania, *with all its provisions and conditions*, and the faith of the State * * * * pledged to carry the same into effect."—*Laws of 1863, p. 214.*

Based upon this broadened foundation, the special work of the State College is INDUSTRIAL EDUCATION; that is, the training of youth in those branches of learning which lie at the foundation of modern industrial pursuits. In accordance with the purposes of its founders and the terms of its original charter, it aims to give special and prominent attention to Agriculture, both theoretical and experimental. But it also provides a "liberal and practical education" in the leading branches of mathematical, natural, and physical Science, in order to prepare youth for "the several pursuits and professions in life," as the laws of Congress and of this State distinctly require. In other words, while the College is no longer exclusively agricultural, it is doing more in the direction of progressive and scientific Agriculture than when that was its principal object; and, at the same time, it has increased its subjects and courses of study, and its teaching and illustrative equipment, to such an extent that it is now a well-organized Scientific Institution, or College of Technology—"without excluding classical studies"—aiming constantly to teach the various sciences in such a manner as to show their applications in the more important industries, and thus to combine theory with practice. Such a course of training, aiming to cover even a part of the vast field of modern scientific knowledge, must necessarily be somewhat prolonged. But its results are showing themselves, in a most gratifying way, by the readiness with which our graduates find honorable and remunerative employment.

The range of work is shown, as far as the limits of space properly allow, in the following schedules and descriptive statements; and the attention of those who are interested in scientific studies, either as a system of higher education, or as a means of preparation for active life, is cordially invited to the extensive facilities here offered.

It is confidently believed that few, if any, institutions in the country furnish opportunity for obtaining either an advanced scientific education, or a shorter course of practical training, of equal extent and thoroughness, at so moderate a cost, and with so many incidental advantages.

LOCATION.—The institution is situated in the village of State College, Centre county, a few miles south-west of Bellefonte, and about equidistant from the extreme parts of the State. Its position in the midst of a broad, rolling valley, with Muncy mountain on the north, Tussey mountain on the south, and Nittany on the east, secures a varied and remarkably beautiful landscape and a healthful climate.

A special act forbids the sale of intoxicating drinks within two miles of the College, and all its surroundings are exceptionally free from demoralizing influences, and from temptations to extravagance.

The main College building is a plain and substantial structure of magnesian limestone, two hundred and forty feet in length, eighty feet in average breadth, and five stories in height, exclusive of attic and basement. It contains the public rooms—such as chapel, library, armory, cabinets, laboratories, society halls, and class-rooms—and a large number of dormitories. The building is heated throughout with steam, one or more upright radiators being placed in every room, hall, and passage-way, and is furnished on every story with an inexhaustible supply of pure water from an artesian well. The sewerage system is frequently and carefully inspected, and the unusual exemption of our students from every form of sickness justifies the statement that the sanitary condition of the building is very nearly perfect.

CAMPUS AND FARM.—The tract of land on which the building stands contains nearly three hundred acres. Of this, about fifty acres in the immediate vicinity of the building constitute the campus, and furnish recreation grounds, sites for the professors' houses, and other needful buildings, &c. The campus contains, at present, several of these residences of professors, and is tastefully laid out and adorned with trees, shrubbery, flower-gardens, and walks.

PRACTICAL TRAINING.—The College has, from the first, sought to combine practical with theoretical instruction, and thus to fix in the student's mind a knowledge of both methods and principles. With this end in view, a portion of each student's time has been set apart for this training, and the number of subjects in which such instruction is given, and the apparatus for it, have been increased to until it covers an extensive range of topics, as will appear from an examination of the several schedules. A portion of this training is largely technical, and so is almost wholly confined to certain courses. Other parts, however, are so general in their character as to be appropriately required of all students. Among these practicums taken by all students, without reference to the particular course of study they may be pursuing, the following may be mentioned for the sake of illustration: *Book-keeping*, so important for the right conduct of all business; *Drawing*, free-hand and mechanical, needed by individuals in all employments and professions; *Military Drill*, required by the law of Congress, and helpful in securing right habits of mind and body; *Mechanic Arts*, in which are learned, among other things, the making of plane surfaces, correct angles and joints, and the care and use of tools; *Horticulture*, where instruction is given in all ordinary operations belonging to fruit-culture, such as pruning, grafting, budding, and propagation by cuttings and layers; and *Surveying*, which acquaints the student with the instruments of the art, and trains him to determine points, distances, and areas. Some of these practicums not only give knowledge of almost universal use, but also serve a good purpose by developing, during the early part of the course, tastes and aptitudes which may determine the student's choice of a technical course and of his life-work.

In the Technical Courses, special lines of practice have a large amount of time given them, proportionate to their importance, or looking to subsequent professional use. Each practicum is directed by an instructor who is familiar with both the theory and the practice, and with their mutual relations. The instruction is so largely personal that an earnest student may advance far beyond the average attainments required as a minimum. The experience of the College adds, from year to year, to the evidence that this training is highly valuable, and in directions which no one can foresee, even when the pupil does not, at the time, fully appreciate its importance.

COURSES OF INSTRUCTION.

The organization of the College is such that the instruction given naturally falls under several departments, which are distinct, and yet so mutually related as to form, when combined in groups, well-proportioned, systematic, and progressive Courses of Study. The number of such courses is now eight, viz: A General Science Course, a Latin-Scientific Course, a General Course in Agriculture, a Course in Mechanical Engineering, and four Technical Courses, designated as Courses in Agriculture, Chemistry and Physics, Civil Engineering, and Natural History, respectively. The studies in the four Technical Courses *are the same for the first two years*, as those in the General Science, or the Latin-Scientific Course, at the option of students.

All students, accordingly, who intend taking a four years' course, enter the General Science Course, or the Latin-Scientific, at the beginning of the Freshman year, continue its studies until the end of the Sophomore year, and then either complete one of these courses or select that one of the Technical Courses which prepares directly for their chosen work. The studies of the first two years are so arranged as to form a course by themselves, especially adapted to meet the wants of those who cannot take a full four years' course, but who desire to fit themselves well as land surveyors, or for any of the ordinary callings of life, at the same time acquiring a fair degree of liberal education.

Students leaving at this period of their course receive from the Faculty a Certificate of their attainments.

Besides the regular courses, of four years each, there are provided a three years' course in Mechanic Arts; Special Courses, of two years each, in Chemistry and in Agriculture; and a Course of the same length in Literature and Science, which is especially designed to meet the wants of young ladies. In this Course ample facilities in vocal and instrumental music are also provided.

The character of the several Courses may be briefly indicated as follows:

1. The General Science Course.

The Course in General Science may fairly be taken as representing the best average of work and of results among all the college courses. It is designed to meet the wants of those who desire to obtain a sound and liberal education through the study of the mathematical, physical, and natural Sciences, and Modern Languages and Literatures, rather than the Ancient Classics. It provides a thorough training in Mathematics and Physics, (with the option of the Calculus in the Junior year,) a sufficient acquaintance with the leading branches of Natural Science, (as Chemistry, Botany, Geology, &c.,) and as much study of Mental, Moral, and Political Science as is found in the usual college course; while the literary studies include an extensive reading of French, German, and English Literatures and literary history. No student can fairly complete this course without having acquired a stock of recent knowledge and a degree of intellectual training which will fit him to enter successfully upon any chosen career and furnish an admirable and effective equipment for the duties of American life and citizenship.

2. The Latin-Scientific Course.

This course is nearly the same as the General Science Course, with the substitution of Latin, for the first five terms, in place of other studies. The course is shown in full in the schedule of studies. While the instruction in Latin is not so extensive as in institutions in which classical studies are allowed to take the leading place, it is given with equal thoroughness and breadth, and is sufficient, both as an instrument of mental training and as an acquisition of learning, for all the needs of ordinary college students.

3. Courses in Agriculture.

In this subject three courses are provided: a General Course, an Advanced Course, and a short Special Course. The object of the General Course is to meet the wants of students who wish to begin the study of Agriculture immediately after leaving the public schools, and, for admission to this, only a knowledge of the common English branches is required. The object of the Advanced Course is to give young men a more thorough *education* at the same time that they are carefully instructed in the relations that thesciences bear to the various branches of Agriculture; to give both the mental training that is indispensable to success, and the scientific and technical knowledge requisite for becoming efficient workers in agricultural directions, whether as practical farmers, teachers, or investigators. Any lower aim would fail to meet, not only the requirements of the laws under which the College is organized, but the progessive demands of the times.

To this end the State College offers to the students of agriculture something more than the meager advantages of a manual labor school, on the ground that otherwise the desired objects could not be reached, and that it is both useless and unjustifiable for a young man to incur the expenses of a college course in order to acquire the manual dexterity that could be secured with little cost elsewhere, and which every farmer's son obtains early in life. The aim of the courses in agriculture is to teach how the principal branches of physical and natural science are applied to the business of farming, and to afford a thorough and comprehensive knowledge of its principles and methods. They explain the nature of soils and of manures, the reasons for and the best methods of tillage, the constituents and characteristics of plants and animals, and the conditions favorable to their development. Practice is combined with theory wherever the processes involve skilled labor; but the student's time is not consumed in the mere manual operations of plowing, planting, and feeding.

PRACTICUMS.—It is intended that the management of the College farms shall be such as is sanctioned by the teachings of science and practice. Of this management, in its various details, the students of the courses in agriculture are to be observers, taking part in actual labor to the extent that is necessary for proper observation. The object of the practicums will, in all cases, be to secure from the student a report of the operations coming under his notice, with discussion of the principles and criticism of the methods involved. The facilities for becoming familiar with the growing of the ordinary farm crops, the use of commercial fertilizers, the manufacture and use of farm manures, and the feeding of animals for the production of meat and milk, are now entirely adequate for ordinary instruction, and the opportunities for making a study of correct farm practice are such as cannot fail to benefit any one intending to adopt agriculture as a calling.

4. Course in Chemistry and Physics.

The instruction in this course is designed for those who wish to become practical or professional chemists or physicists, as teachers and investigators, or as metallurgists, or manufacturers in chemical industries; or for those who wish to pursue medicine, pharmacy, mining, and similar professional or industrial occupations.

The extensive and well-equipped laboratories afford ample opportunities for qualitative and quantitative work in both chemistry and physics; they enable the student of physics to verify the action and laws of physical force, the assayist to determine the value of ores, and the agriculturist to ascertain the composition of his organic products. Probably no two subjects of scientific study are intimately connected with so wide a range of modern industries as those which make up this course. During several terms past, more than usual attention has been given, in the department of Physics, to the recent important development of electrical science and its extensive practical applications.

5. Courses in Civil and Mechanical Engineering.

The object of these Courses is to give thorough instruction in the studies and practical work pertaining to the two professions. The same studies, to a considerable extent, are necessary to the architect also, and to the mining engineer; and are valuable to any who desire proficiency in the applications of mathematics or physics. The work of the Courses is so arranged that students may become thoroughly familiar with the theory and practice of field operations, the use and care of instruments, and the work of the drawing-room; and, through systematic training, establish a sound basis for future usefulness and success in the higher branches of the profession, or any of its specialties. The harmony between theory and practice, and their mutual dependence, is dwelt upon in order to develop the power to think, as well as the ability to execute. To this end, experimental as well as rational methods are habitually introduced; as, for instance, while studying the principles from which the resistance of materials is deduced, the student verifies them by experiment in the work-shop. And in like manner, at every stage of the work, the applications of principles are taught as second in importance only to a thorough knowledge of the principles themselves. The new Mechanic Arts building, with its equipment, is available for these courses.

6. Mechanic Arts.

Combining shop-work and study.

This course was begun about four years ago, but has lately been reorganized and greatly extended. During the past year, a new and substantial frame building, two stories high, has been built, and equipped with a good supply of the best modern tools and machinery, and the department has now excellent facilities for giving the successive grades of training. It is designed to afford such students as have had the ordinary common-school education an opportunity to continue the elementary scientific and literary studies, together with mechanical and free-hand drawing, while receiving theoretical and practical instruction in the various mechanical arts. The instruction in shop-work is given by means of exercises so planned as to cover, in a systematic manner, the operations in use in the various trades.

The object of the course being to give instruction in the use of tools, only such constructions are made as cover principles without undue repetition. The first instruction in carpentering and joining is in the use of the saw and plane in working wood to given dimensions; and a series of elementary exercises follow in order, such as practice in making square joints, different kinds of dove-tails, the various tenons, roof-trusses, panels, &c. The instruction in turning and circular-section pattern-making is given from a series of models; also bench-patterns are made for subsequent use in the foundry.

The foundry course consists in casting from the patterns which the student himself has previously made. Many of the pieces cast from these patterns are used in his clipping and filing work.

In the forge shop are taught the management of the fire and the degree of heat necessary to forge the different metals. Drawing, forming, bending, upsetting, fagoting, splitting, punching, chamfering, annealing, tempering, case-hardening, &c., are taught by means of a series of exercises in which the elements of the iron-forger's art are particularly dwelt upon. Every piece is made to certain dimensions laid down upon the drawing, the article being forged before the class by the instructor, who directs attention to the essential features of the operation, which is then repeated by each student. The course in vise-work includes filing to line, filing to template, free-hand filing, fitting, and chipping straight and grooved surfaces in cast-iron, wrought-iron, and steel. In the machine-shop the student, after having the lathe and its mechanical construction explained to him, is taught centering, tape-turning, chucking, reaming, inside and outside screw-cutting, bolt-turning, &c. He is then required to construct some piece of mechanism in which these principles are involved.

It may be thought that the variety of operations in the mechanic arts is so great as to make it impossible to give the student any real knowledge in the time at his disposal. It should be borne in mind, however, that this multiplicity of processes may be reduced to a small number of manual operations, and the numerous tools employed are only modifications of, or convenient substitutes for, a few tools which are in general use. The uses of the lathe are, to a great extent, the same, whether the material is bone, metal, or wood; whether the moving power be derived from the workman's foot, from a water-wheel, or from a steam-engine. Again, as fitting depends on a correct eye and manual skill, he who has learned to fit in metal by means of the clipping-hammer and the file, will not long find difficulty in fitting wood by means of the saw, the plane, and the chisel. Mastery over a few processes and a few tools of universal application, acquaintance with the methods of fitting and finishing, and with the ordinary means of transmitting and converting power, are then the essential points embraced in this course.

The Drawing of this course extends through the entire three years. This work is looked upon as of the highest importance, and the effort is to make the instruction thorough, practical, and of direct utility. Considerable time is devoted to free-hand drawing, as it is believed that it not only assists in mechanical drawing, but is of great service in after years, whatever the occupation.

The mechanical drawing consists of a series of exercises, and such are selected as will be of subsequent use. They are arranged in progressive order, beginning with geometrical constructions involving straight lines and circular arcs only, and ending with the more complex curves, such as the ellipse, helix, epicycloid, &c. Projection is next taken up. The instruction in this is from models, so that the student may have before him the actual object from which the projection is made, and not be obliged to depend upon his unaided conception. After completing this work, he is required to draw parts of machines from actual measurements. For this purpose he is given some piece of mechanism to sketch and measure, and of which, finally, he is to make complete working-drawings.

In Mathematics, the instruction covers Algebra, Plane and Solid Geometry, Plane and Spherical Trigonometry, Land Surveying, and Mechanics, taught with special reference to this class of students, many practical applications being made. Candidates for this course must be at least fourteen years of age, and pass a satisfactory examination in the following subjects: Thompson's Complete Arithmetic (or its equivalent) to ratio; English Grammar, (Syntax and Etymology;) Geography and Spelling. The following table gives the course of study and shop-work in detail:

YEARS.	Session.	STUDIES.	Hours per week.	SHOP-WORK.	Hours per week.
FIRST YEAR.	Fall.	United States History, . .	3	Carpentering, ...	4
		Arithmetic, ...	4	Drawing, . .	5
		English Grammar, . . .	5	(Geometrical Free-hand,)	
	Winter.	Algebra begun, . . .	5	Carpentering and joining,	8
		English Composition, . .	5	Drawing, . . .	5
		United States History, . .	5	(Model and Object,) . . .	
	Spring.	Algebra, . . .	5	Wood-turning, ...	6
		English Composition, . .	5	Designing, ...	5
		Book-keeping, . . .	4		
SECOND YEAR.	Fall.	Geometry, ...	2	Pattern-making, ...	4
		Algebra, ...	5	Drawing, ...	4
		Physics, ...	4	(Geometrical,)	
	Winter.	Geometry, ...	2	Foundry work, ...	6
		Algebra, ...	4	Orthographic Projection and Intersections, . . .	5
		Physics, ...	4		
		English, ...	2		
	Spring.	Geometry, ...	4	Forging, ...	8
		Algebra, ...	2	Development of Surfaces and Isometric Perspective, ...	8
		Mechanics, ...	3		
		English, ...	2		
THIRD YEAR.	Fall.	Algebra, ...	3	Forging, ...	6
		Geometry, ...	3	Linear Perspective and Shades and Shadows, .	9
		Mechanics, ...	4		
	Winter.	Geometry, ...	3	Vise work, ...	6
		Trigonometry, ...	3	Detail Drawing, ...	9
		Rhetoric, ...	4		
	Spring.	Trigonometry and Surveying, ...	5	Machine tool work, . . .	9
		Mechanism, ...	3	Machine Designing, . . .	9

7. Ladies' Course.

Young women are admitted to all classes, in all Courses, on the same terms as young men. But a separate course has been established, containing more of the branches of study that are thought likely to be especially serviceable to them, with less extended requirements in Mathematical and Scientific studies. Parents who send their daughters to the College may rely upon their being surrounded by kindly and healthful influences, under the direction of a competent lady principal.

Young ladies not residing at their own homes occupy rooms in the portion of the main College building set apart for their use, either taking their meals with the boarding club or combining in groups to board themselves, facilities for that purpose (and some slight aid) being provided by the College. Table board can be obtained for them, when desired, in excellent private families.

The requirements for admission to this course are the same as for the General Science Course. The studies are as follows:

FIRST YEAR.

FALL SESSION—German (5), French (3), History (4).
Electives—Algebra (3), Chemistry (4), Latin (4), Geometry (3).
Practicum—Free-hand Drawing or Music.
WINTER SESSION—German (5), French (3), History (2).
Electives—Chemistry (4), Geometry (3), Trigonometry (3), Latin (4), Rhetoric (4).
Practicum—Mechanical Drawing or Music.
SPRING SESSION—German (5), French (3), History (2).
Electives—Trigonometry (5), Physiology (3), Chemistry (3), Latin (4), English Literature (4), Botany (4).
Practicum—Industrial Drawing and Designing, or Music and Botany.

SECOND YEAR.

FALL SESSION—German (2), French (2), Botany (4), Logic (3).
Electives—Higher Mathematics (4), Geology (4), Political Economy (4), Latin (3), English Literature (4).
Practicum—Botany (or Geology for such as elect that study) and Music.
WINTER SESSION—French (3), History of Civilization (4).
Electives—Higher Mathematics (4), Zoölogy (4), Constitutional History (4), Geology (2), Astronomy (3), Latin (3), German (2).
Practicum—Botany or Geology or Zoölogy for such as elect either of those studies, and Music.
SPRING SESSION—English Literature (4), Mental Philosophy (4), Ethics (4).
Electives—Astronomy (3), Zoölogy (2), International Law (4).
Practicum—Music.

8. Special Courses: (1) In Agriculture, and (2) in Chemistry.

These short Special Courses of two years each are designed to afford to those who, for any reason, are unable to take a full course opportunity to acquire a practical working knowledge of some of the leading facts, principles, methods, and applications of the more important branches of Natural Science. Students in these courses are expected to devote more than the usual proportion of time to laboratory and other technical practice; and thus to compensate for shortness of time by increased diligence. Only so much of other studies is introduced as is requisite to secure full employment of time and some moderate degree of general cultivation. The Courses are shown in detail in the schedule on a subsequent page. Students completing either of the Courses receive a special certificate.

9. Partial Courses.

Students of mature years, and younger students whose parents or guardians request it, are permitted to choose (among college studies, but not preparatory) such special course as they may need. Such students must be prepared to enter upon and pursue with profit the studies chosen. They are required to have the same number of hours of class-work as other students, and to take part in the practicums to which they are assigned. Subject to these requirements, and to the ordinary discipline of the College, any person is at liberty to select from the entire range of studies such branches as he may wish to pursue, and for such length of time as he may find convenient, the purpose of this arrangement being to bring the advantages of the institution as fully as possible within reach of every young man and woman in the State. Students are earnestly advised to enter one of the Regular Courses, and pursue it systematically to the end; but in cases where that is not feasible, IT IS INTENDED TO MAKE THE STATE COLLEGE, TO THE FULL EXTENT OF ITS RESOURCES, A PLACE WHERE ANY PERSON MAY OBTAIN THAT KIND AND DEGREE OF EDUCATION WHICH IS MOST DIRECTLY SUITED TO HIS CIRCUMSTANCES AND PURPOSES IN LIFE.

To those who satisfactorily complete one year or more of such special work, certificates, under the seal of the institution, are given, setting forth the studies which they have pursued, and their proficiency therein.

GENERAL STATEMENTS.

1. Degrees.

The degree of Bachelor of Science is conferred upon graduates of all the four years' courses, except the general course in Agriculture. The diploma given to graduates of the technical courses contains mention, also, of the special line of technical work pursued.

The degree of Master of Arts, or Master of Science, is conferred upon graduates of the State College, of at least three years' standing, who are known to have been systematically pursuing scientific, literary, or professional studies, or who have, satisfactorily to the Faculty, studied at least one year in the graduate courses. Higher degrees, such as C. E., Ph.D., D. S., &c., are only conferred at the end of prescribed courses of advanced study, or in recognition of high professional attainments.

2. Graduate Instruction.

Persons who have been graduated in one of the above regular courses, or an equivalent course elsewhere, are permitted to enter the college for instruction in an advanced course, consisting of such studies as may, in view of the circumstances of each case, be approved by the Faculty, receiving at the completion of such course the appropriate degree.

3. Libraries and Reading-rooms.

The library belonging to the College has about four thousand volumes, embracing scientific and technical works, memoirs, scientific essays, agricultural and educational works, &c., in English, French, and German, forming the nucleus of a fine scientific library. From four to five hundred volumes per year are being added.

The reading-room in connection with the College library offers to Faculty and students an ample and well-selected list of scientific and other periodicals, foreign and American.

Donations of books and periodicals are invited from friends of the institution, publishers, and authors.

Each of the two students' literary societies has a good library of standard and miscellaneous works, and a reading-room supplied with the principal literary periodicals and newspapers of the day.

4. Free (Senatorial) Scholarships.

There have recently been established by the Trustees fifty scholarships, one for each senatorial district in the State, entitling the holder to *exemption from all College charges*, (except for materials used in the laboratories,) in any of the regular four-years' College courses. The scholar, male or female, is to be appointed by the Senator of the district, after a competitive examination in the studies required for admission to the Freshman class. No person is eligible as a candidate who has previously been admitted to any class in the College.

The holder of the scholarship is admitted to the privileges of any of the regular College courses (*but not the Preparatory or special courses*) free of the ordinary charges for incidentals, room-rent, and furniture; this immunity to continue for the entire College course, provided that both conduct and class-standing be satisfactory to the Faculty. A vacancy may be filled after the opening of the college year, if the appointee's attainments do not fall below the standard of the class at the time of the application for admission. For information as to vacancies, time and place of examination, &c., candidates for a scholarship should apply to their Senator, in whose hands the details of appointment have been placed by the College.

5. Discipline.

The discipline of the College is intended to be strict, but reasonable and considerate. It assumes that students come here, not to spend their time in idleness, but to prepare themselves for useful and honorable careers in life. The aim of the Faculty is to lead students to cultivate habits of steady application, self-control, a high sense of honor, truthfulness, and an interest in maintaining the purity of the moral atmosphere of the institution. Those who are not disposed to support heartily a discipline of this kind are urged not to apply for admission. Students whose influence, after fair trial, is found to be injurious to good scholarship or good morals will be removed from the institution.

6. Expenses.

No charge whatever is made for tuition, except for special instruction in music.

Incidentals.—Each student, whether from a distance or a resident in the neighborhood, is required to pay $17 a year for the fuel, lights, and care of the recitation and other public rooms, viz: $7 for the fall session, $5 for the winter, and $5 for the spring. This is the only charge made to pupils who do not room in the College. The charges to those who room in the College are as follows:

Fall Session.—	Incidentals,	$ 7
	Room rent, fuel, and furniture,	11
Winter Session.—	Incidentals,	5
	Room rent, fuel, and furniture,	14
Spring Session.—	Incidentals,	5
	Room rent, fuel, and furniture,	8

The charge for room rent, fuel, and furniture is made on the basis of two persons to each room. In cases where a student rooms alone, he will be charged $4 additional per session.

By a resolution of the Board of Trustees, the Business Manager is required to collect from each student, before he is permitted to enter his name upon the College roll, an amount sufficient to cover all his college bills for the current session, besides a special deposit of $5 as security against damages; or, in case the student cannot pay immediately, to require a note, with sufficient security, for the payment at some future time, unless excused by the Executive Committee.

Laboratory Expenses.—Students in the laboratories pay a small charge for their outfit; also, for apparatus destroyed and material consumed by them.

BOARDING.—The College does not maintain a boarding-hall, and most students depend upon the boarding-houses in the vicinity, the regular charge being $3 per week. The College offers special facilities to those who board themselves singly, and also to the College Boarding Club, which supplies its members, now numbering more than forty, with good boarding at about $2 per week.

FURNITURE.—The furniture provided for students who room in the building consists of a bedstead, mattress, table, washstand, and chair. The student provides all other articles, including bedding, wash-bowl and pitcher, mirror, lamp, etc.

UNIFORM.—Each cadet is required to provide himself with a uniform of dark blue cloth—coat, pantaloons, and cap—as per pattern in the College. The cap and pantaloons are such as may be worn upon any occasion without attracting undue attention. One dress coat, with proper care, will last during an entire college course. Measures are taken at the College, and orders filled by Mr. John Wanamaker, Philadelphia. The uniform for cadets costs, at present, $16 35, viz: coat, $9 30; pantaloons, $5 69; cap, $1 45, and must be paid for when ordered.

MUSIC.—Instruction on the piano or organ will be given at the rate of $10 for twenty lessons, and $3 per quarter for use of instrument in practicing.

WASHING is at the rate of fifty cents per dozen.

BOOKS AND STATIONERY can be procured at stores near the College at Philadelphia retail prices.

DAMAGES.—Persons causing special damages will be required to pay for the same. General damages will be assessed upon the body of students.

All remittances should be made to the President, State College, Centre county, Pa., by draft or by money-order drawn on State College post-office.

SESSIONS AND VACATIONS.

The College Year is divided into three sessions:

The Fall Session of about fourteen weeks, beginning on the second Wednesday of September, and ending on the third Friday of December; the Winter Session of twelve weeks, and the Spring Session of twelve weeks.

VACATIONS.—The winter vacation is three weeks, the spring, one, and the summer, ten.

BULLETINS OF EXPERIMENTS.

During the last year, the Bulletins of agricultural experiments have been continued, and the successive issues (8000 copies of each) have been widely distributed throughout the State. For some numbers the demand has been so great as to exhaust our supply, and there have been numerous calls from other States as well as our own. The design is to make these Bulletins as practical as possible, giving the results of experiments, investigations, and discussions, and placing them directly and promptly in the hands of farmers and others interested in agricultural progress. The Bulletins are furnished free of charge to any person making application for them.

ADMISSION TO COLLEGE.

Examinations for admission are held on Tuesday of Commencement week, and on the day before the opening of the fall session, the dates being, for 1887, the 28th of June and the 13th of September, respectively. It is desirable, on every account, that candidates be present on one or both of these days. Those who cannot do so will be examined at any time during the year, and admitted to the class for which they are found prepared.

In all cases, the applicant for admission must present evidences of good character, and of honorable dismissal when coming from another college.

For admission to the Freshman class, candidates (of either sex) must be at least fifteen years of age, and pass a satisfactory examination in the following subjects:

1. FOR THE GENERAL SCIENCE COURSE: English Grammar, Arithmetic, Geography, both Descriptive and Physical; United States History; Higher Algebra through Quadratics and Progressions; Wentworth's Geometry, four books; and the Elements of Natural Philosophy.
2. FOR THE LATIN-SCIENTIFIC COURSE: The same as above, with the addition of four books of Cæsar, and three orations of Cicero.
3. FOR THE LADIES' COURSE: The same as for the General Science Course or the Latin-Scientific Course.
4. FOR THE GENERAL COURSE IN AGRICULTURE: The same as for the Preparatory Department, (see page 19.)
5. FOR THE SPECIAL COURSE IN AGRICULTURE: The same as for the General Science Course.
6. FOR THE SPECIAL COURSE IN CHEMISTRY: Applicants will be admitted without examination, except in Mathematics. In that branch no fixed amount will be absolutely required, at present, beyond a thorough knowledge of Arithmetic, including the Metric System; but, in order to derive the greatest advantage from the course, it is recommended that students be so far advanced as to have completed the mathematical studies of the Freshman year.
7. FOR THE COURSE IN MECHANIC ARTS: The same as for the General Course in Agriculture.
8. FOR PARTIAL COURSES, applicants must at least be prepared to enter the Freshman class in the branches of study which they wish to pursue. Such courses are not provided for students in the preparatory grade.
9. GRADUATES OF STATE NORMAL SCHOOLS and of a SELECT LIST OF HIGH SCHOOLS AND ACADEMIES in Pennsylvania, whose standard of requirements has been ascertained to be satisfactory, will be admitted to the Freshman class without further examination in studies which, as shown by their diploma or certificate, they have successfully completed in such institutions.
10. THE HOLDERS OF SENATORIAL SCHOLARSHIPS are admitted on the certificate of the examining committees in the several Senatorial districts.
11. APPLICANTS FOR ADVANCED STANDING, in any course, must pass a further examination in the studies which have been pursued by the class for which they are candidates.

THE FULL COURSES OF INSTRUCTION occupy four years, with three terms or sessions in each year. The following schedules of studies indicate the amount of work required in the several courses, and the equivalent which will be accepted from candidates for advanced standing.

SCHEDULES OF STUDY.

[Figures after subjects indicate hours of recitation or practice per week.]

1. GENERAL COURSE IN AGRICULTURE.

First Year.

FALL SESSION.—Arithmetic (4), Physiology (4), United States History (3), English Grammar (5).
WINTER SESSION.—Algebra (5), U. S. History (5), English Composition (5).
Practicum—Zoölogy, Laboratory Work.
SPRING SESSION.—Algebra (5), Botany (5), English Composition (5).
Practicum—Book-keeping.

Second Year.

FALL SESSION.—Algebra (4), Geometry (2), Natural Philosophy (4), Elements of Agricultural Chemistry (5).
Practicums—Drawing (4), Horticulture (4).
WINTER SESSION.—Algebra (4), Geometry (2), Natural Philosophy (4), Elements of Scientific Agriculture (5).
Practicum—Mechanic Arts (6).
SPRING SESSION.—Algebra (2), Geometry (4), Descriptive Botany (4), Elements of Scientific Agriculture (5).
Practicums—Botany (4), Horticulture (4).

Third Year.

FALL SESSION.—Chemistry (4), Horticulture (3), Geometry (3), Mechanics (4).
Practicums—Chemistry (4), Zoölogy (4), Mechanics (4).
WINTER SESSION.—Chemistry (4), Geometry (3), Trigonometry (3), Zoölogy (4).
Practicums—Chemistry (8), Zoölogy (4).
SPRING SESSION.—Agricultural Engineering (3), Comparative Physiology (3), Trigonometry and Surveying (5), Mental Science (4).
Practicums-Chemistry, one half term, Quantitative Analysis (10), Surveying, one half term (8).

Fourth Year.

FALL SESSION.—Agricultural Chemistry (3), Anatomy and Breeding (4), Botany, (4), Political Economy (4).
Practicums—Dissection (2), Chemistry (Quantitative Analysis) (4), Botany (4).
WINTER SESSION.—Agricultural Chemistry (4), Feeding (4), Veterinary Science (3), Constitutional Law (4).
Practicums—Care of Stock (4), Analysis of Agricultural Products (6).
SPRING SESSION.—Fertilizers (4) Entomology (4), Dairy Farming (3), Moral Science (4).
Practicums—Agriculture (6), Entomology (6).

2. ADVANCED COURSE IN AGRICULTURE.

[The studies of the first two years in this Course are the same as in the General Science or the Latin-Scientific Course.]

Junior Class.

FALL SESSION.—Rational Mechanics (4), Agricultural Chemistry (3), Cryptogamic Botany (4), Logic (3).
Practicums—Physics (4), Chemistry (6).
WINTER SESSION.—Physics (4), Agricultural Chemistry (4), Zoölogy (4), Agricultural Engineering (3).
Practicums—Zoölogy or Physics (4), Chemistry (6).
SPRING SESSION.—Mineralogy (1), Mental Science (4), Entomology (2), Fertilizers (4), Crops (1), Zoölogy (2).
Practicums—Agriculture (4), Entomology (6).

Senior Class.

FALL SESSION.—Anatomy and Breeding (4), Geology (4), Political Economy (4), Horticulture (3), Crops (2).
Practicums—Agriculture (5), Dissection (5).
WINTER SESSION.—Geology (2), Constitutional Law (4), Feeding (4), Veterinary (4), Farm Economy (1).
Practicum—Agriculture (10).
SPRING SESSION.—Dairy (3), Sheep Husbandry (1), Moral Science (4), History of English Literature (3), History of Agriculture (1).
Practicum—Agriculture, (original work) Thesis.

3. SPECIAL COURSE IN AGRICULTURE.

[See explanation on page 10.]

First Year.

FALL SESSION.—Chemistry (4), Algebra (3), Geometry (3), Natural Philosophy (4).

Practicums—Horticulture (4), Chemistry (4), Drawing (4).

WINTER SESSION.—Chemistry (4), Agricultural Engineering (3), Trigonometry (3). Geometry (3).

Practicums—Chemistry (3), Mechanic Arts (6).

SPRING SESSION.—Chemistry (3), Physiology (3), Botany (4), Trigonometry (5).

Practicums—Chemistry (4), Horticulture (2), Botany (4), Physiology (2).

Second Year.

FALL SESSION.—Agricultural Chemistry (3), Anatomy and Breeding (4), Botany (4).

Practicums—Chemistry (6), Dissection (5).

WINTER SESSION.—Agricultural Chemistry (4), Cattle Feeding (4), Zoölogy (4).

Practicums—Chemistry (6), Zoölogy (4), Agriculture (6).

SPRING SESSION.—Fertilizers (4), Entomology (4), Dairy Farming (4), Sheep Husbandry (1), Zoölogy (2).

Practicums—Entomology (6), Agriculture (6), Surveying (3).

4. GENERAL SCIENCE COURSE.

Freshman Class.

FALL SESSION.—Algebra (3), Geometry, (3), German (5), History (4).

Practicums—Drawing (4), Horticulture (4).

WINTER SESSION.—Trigonometry (3), Geometry (3), Rhetoric (4), German (5).

Practicums—Drawing (2), Mechanic Arts (6).

SPRING SESSION.—Trigonometry and Surveying (5), Physiology (3), German (5), Tactics (2).

Practicums—First half of session—Horticulture (4), Physiology (4). Second half of session—Surveying (3).

Sophomore Class.

FALL SESSION.—Analytical Geometry (4), Chemistry (4), German, (2), French (3), History (2).

Practicums—Drawing (6), Chemistry (4).

WINTER SESSION.—Analytical Geometry (4), Chemistry (4), German (2), French (3), History (2).

Practicums—Chemistry (3), Mechanic Arts (2).

SPRING SESSION.—Chemistry (3), Descriptive Botany* or Railroad Surveying (4), History (2), French (3), Differential Calculus* (4).

Practicums—Chemistry (6), Botany (4).

Junior Class.

FALL SESSION.—Rational Mechanics (4), French (2), German (2), Logic (3), Botany (4), or Integral Calculus (3).

Practicums—Mechanics (4), Botany (4), Anatomy and Physiology (4).

WINTER SESSION.—Physics (4), French (3), Zoölogy (4), Constitutional History (4).

Practicums—Physics (4), Zoölogy (4), Botany (2).

SPRING SESSION.—Physics (4), Mineralogy (1), Mental Science (4), English Literature (4), Zoölogy (2).

Practicums—Physics (3), Mineralogy (6).

Senior Class.

FALL SESSION.—Physics (4), Geology (4), Political Economy (4), English Literature (3.)

Practicums—Physics (2), Geology (5).

WINTER SESSION.—Geology (2), Constitutional Law (4), Astronomy (3), History of Civilization (4), Physics (3).

Practicums—Geology (3), Physics (2).

SPRING SESSION.—International Law (4), Astronomy (3), Moral Science (4), History of English Literature (3).

Practicums—Original work—elective (5), Thesis or Oration.

5. LATIN-SCIENTIFIC COURSE.

Freshman Class.

FALL SESSION.—Algebra (3), Geometry (3), German (5), Latin (4).

Practicums—Drawing (4), Horticulture (4).

WINTER SESSION.—Trigonometry (3), Geometry (3), Latin (4), German (5).
Practicums—Drawing (2), Mechanic Arts (6).
SPRING SESSION.—Trigonometry and Surveying (5), German (5), Latin (4).
Practicums—First half of session—Physiology (4), Horticulture (4). Second half of session—Surveying (8).

Sophomore Class.

FALL SESSION.—Analytical Geometry (4), Chemistry (4), History (2), Latin (3), French (3.).
Practicums—Drawing (6), Chemistry (4).
WINTER SESSION.—Analytical Geometry (4), Chemistry (4), History (2), Latin (3), French (3).
Practicums—Chemistry (6), Mechanic Arts (2).
SPRING SESSION.—Chemistry (3), Descriptive Botany* or Railroad Surveying (4), Differential Calculus* (4), Physiology (3), French (3).
Practicums—Chemistry (6), Botany (4).

[The studies of the last two years in this Course are the same as in the General Science Course.]

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*NOTE.—For the Differential Calculus of this session, students preparing for the Course in Agriculture or Natural History may substitute seven hours of practicum in Chemistry. Students preparing for the Course in Civil Engineering will substitute Railroad Surveying for Descriptive Botany.

6. COURSE IN CHEMISTRY AND PHYSICS.

[The studies of the first two years in this Course are the same as in the General Science or the Latin-Scientific Course.]

Junior Class.

FALL SESSION.—Rational Mechanics (4), Chemistry (3), Logic (3), Integral Calculus (3).
Practicums—Mechanics (4), Chemistry (8).
WINTER SESSION.—Physics (4), Chemistry (4), Method of Least Squares (2).
Practicums—Physics (4), Chemistry (16).
SPRING SESSION.—Physics (5), Chemistry (4), Mineralogy (1), Mental Science (4).
Practicums—Physics (3), Chemistry (3), Mineralogy (6).

Senior Class.

FALL SESSION.—Physics (4), Chemistry (3), Geology (4), Political Economy (4).
Practicums—Physics (4), Chemistry (8).
WINTER SESSION.—Physics (3), Chemistry (3), Geology (2), Constitutional Law (4).
Practicums—Physics (4), Chemistry (14).
SPRING SESSION.—Physics (4), Chemistry (3), Moral Science (4), History of English Literature (3).
Practicums—Physics (3), Chemistry (10), Thesis.

7. COURSE IN CIVIL ENGINEERING.

[The studies of the first two years in this Course are the same as in the General Science or the Latin-Scientific Course.

Junior Year.

FALL SESSION.—Rational Mechanics (4), Integral Calculus (3), Descriptive Geometry (4), Mechanical Drawing (2).
Practicums—Surveying (6), Experimental Mechanics (4).
WINTER SESSION.—Applied Mathematics (3), Method of Least Squares (2), Physics (4), Descriptive Geometry (3).
Practicums—Mechanical Drawing (8), Physics (4).
SPRING SESSION.—Analytical Mechanics (2), Properties of Materials (3), Railroad Surveying and Earth-work (3), Physics (4), Mineralogy (1).
Practicums—Topographical Surveying (6), Mineralogy (6).

Senior Year.

FALL SESSION.—Graphical Statics (4), Political Economy (4), Analytical Mechanics (3), Geology (4).
Practicums—Geology (4), Field-work (4).
WINTER SESSION.—Constitutional Law (4), Geodesy and Practical Astronomy (6), Graphical Statics (4), Sanitary Engineering (4).
Practicum—Draughting (12).
SPRING SESSION.—Specifications and Contracts (2), Map Projections (3), Moral Science (4).
Practicums—Field Practice (4), Draughting (2), Thesis.

8. COURSE IN MECHANICAL ENGINEERING.

Freshman Class.

FALL SESSION.—Algebra (3), Geometry (3), German (5), History (4).
Practicums—Drawing (4), Mechanic Arts (4).
WINTER SESSION.—Trigonometry (3) Geometry (3), Rhetoric (4), German (5).
Practicum –Drawing (2), Mechanic Arts (6).
SPRING SESSION.—Trigonometry and Surveying (5), Physiology (3), German (5).
Practicum—First half of Session—Mechanic Arts (4), Physiology (4), Second half of Session—Surveying (8).

Sophomore Class.

FALL SESSION.—Analytical Geometry (4), Chemistry (4), German (2), French (3), History (2).
Practicum—Drawing (6), Chemistry (4).
WINTER SESSION.—Analytical Geometry (4), Chemistry (4), German (2), French (3), History (2).
Practicum—Chemistry (8), Mechanic Arts (2).
SPRING SESSION.—Chemistry (3), Mechanism (4), History (2), French (3), Differential Calculus (4).
Practicum—Drawing (6), Mechanic Arts (4).

Junior Class.

FALL SESSION.—Rational Mechanics (4), Integral Calculus (3), Descriptive Geometry (4), Graphical Statics (4).
Practicum—Mechanical Drawing (4), Mechanics or Shop-work (4).
WINTER SESSION.—Analytic Mechanics (3), Method of Least Squares (2), Physics (4), Descriptive Geometry (3), Integral Calculus (2).
Practicum—Mechanical Drawing (5), Shop-work (5).
SPRING SESSION.—Analytic Mechanics (3), Properties of Materials (3), Differential Equations (3), Physics (4).
Practicum—Mechanical Drawing (4), Shop-work (4), Mineralogy (4).

Senior Class.

FALL SESSION.—Quaternions (4). Political Economy (4), Valve Gearing and Experimental work with Indicator and Inspirator (3), Geology (4).
Practicum—Mechanical Drawing (6), Shop-work (6).
WINTER SESSION.—Quaternions (3), Mechanics of Engineering (4), Constitutional Law (4), Astronomy (4).
Practicum—Mechanical Drawing (6), Shop-work (6).
SPRING SESSION.—Astronomy (4), Machine Designing (4), Imaginaries (3), Steam Engine (3).
Practicum—Drawing. *Thesis.*

9. SPECIAL COURSE IN CHEMISTRY.

First Year.

FALL SESSION.—General Chemistry (4), Mathematics (5), German (5).
Practicum—Laboratory Practice.
WINTER SESSION.—Chemistry (4), Mathematics (5), German (5).
Practicum—Qualitative Analysis.
SPRING SESSION.—Chemistry (3), German (5), Mathematics (5).
Practicum—Qualitative Analysis.

Second Year.

FALL SESSION.—German (2), Mathematics (4), Chemistry, with Quantitative Analysis.
WINTER SESSION.—German (2), Mathematics (4), Chemistry, with Quantitative Analysis (4).
SPRING SESSION.—Mathematics (4), Chemistry, with Quantitative Analysis.

THE PREPARATORY DEPARTMENT.

This department is intended to furnish instruction to students well trained in the Elementary Common School Branches, and yet not fully prepared for admission to the Freshman class. It does not, however, offer instruction in the Primary branches, nor is it in any sense a High School. The studies are arranged chiefly with reference to their importance in preparing students for one of the regular College Courses, namely, the General Science or the Latin-Scientific.

Special care is taken to make the instruction systematic and thorough, that the foundation for future study may be securely laid.

Students in this department, except those who are under the immediate care of their parents or guardians, are required to room in that part of the building assigned to the department. Here they are under the personal supervision of the principal of the department and his assistants.

In addition to the regulations governing the College students, they are required to observe study hours. During such periods they must neither pay nor receive visits; and every effort is made to train them to habits of close attention and to correct methods of study. At other times than in recitation and study hours, preparatory students can associate with the College students, and thus have the benefit of their experience in literary societies, recreations, &c.

ADMISSION.

FIRST YEAR.—All applicants for admission must be at least fourteen years of age, and be prepared, at the beginning of the autumn session, to pass a satisfactory examination in the following branches:

Arithmetic—Thompson's Complete (or its equivalent) to Ratio; English Grammar, Brown's Revised, (or its equivalent,) to page 250, which includes Etymology and Syntax.

In Geography, Spelling, Reading, and Penmanship, the examination must show such acquaintance with those branches as not to require further instruction in them.

SECOND YEAR.—Those who apply for admission to the autumn session of the *Second Year* must be prepared to pass, in addition to the above, an examination on all the work of the *First Year.*

All persons entering classes after the opening of the first session will be required to pass an examination in the work already gone over by the class into which they seek admittance.

TUITION in this department is free; other charges are the same as in the College proper.

EXAMINATION FOR ADMISSION, Tuesday, September 13, 1887, at nine o'clock, A. M.

SCHEME OF WORK.

In connection with the Schedule, the following outline of work will indicate the course of studies more in detail:

First Year.	*Second Year.*
Fall.—Newcomb's Elementary Algebra, to page 80. Thompson's Complete Arithmetic, completed from Ratio. Hutchison's Physiology and Hygiene. Well's English Grammar, completed from Syntax. Comstock's First Latin Book, fifty lessons.	**Fall.**—Newcomb's Algebra for Colleges, page 85 to 200. Wentworth's Plane Geometry, to page 54. Avery's Natural Philosophy, to Chapter VII. Lancaster's History of England. Cæsar, Books III and IV; and Allen's Composition, first 13 lessons.
Winter.—Algebra, continued to page 152. Parker's Exercises in English Composition, to Part III. Scudder's History of the United States, to Part III. Comstock's Lessons in Latin, completed.	**Winter.**—Algebra, continued to page 272. Natural Philosophy completed. Colegrove's Scientific Grammar. Wentworth's Plane Geometry, to page 102. Cicero—first two Orations in Catilinam; Composition continued to 24th Lesson.
Spring.—Algebra, continued to page 210. English Composition, completed. Scudder's History of the United States, completed. Cæsar, first two books. Morse's First Lessons in Zoölogy.	**Spring.**—Geometry, continued through fourth book. Algebra, continued to page 320. Houston's Physical Geography. Cicero—Third and Fourth Orations in Catilinam. Composition continued to 34th Lesson.

SCHEDULE OF STUDIES.

YEAR.	Session.	SCIENTIFIC COURSE.	Hours per week.	LATIN-SCIENTIFIC.	Hours per week.
"B," OR FIRST YEAR.	Fall.	Algebra,	4	Algebra,	4
		Arithmetic,	3	Arithmetic,	3
		Physiology,	4	Physiology,	4
		English Grammar,	5	Latin,	5
	Winter.	Algebra,	5	Algebra,	5
		English Composition,	5	English Composition,	5
		United States History,	5	Latin,	5
		Zoölogy,	5	Zoölogy,	5
	Spring.	Algebra,	5	Algebra,	5
		United States History,	5	United States History,	5
		English Composition,	5	Latin.	5
		Drawing,	3	Drawing,	3
		Book-keeping,	4	Book-keeping,	4
"A," OR SECOND YEAR.	Fall.	Geometry,	2	Geometry,	2
		Algebra,	4	Algebra,	4
		Physics,	4	Physics,	4
		English History,	5	Latin,	5
		Drawing,	5	Drawing,	5
	Winter.	Algebra,	4	Algebra,	4
		Geometry,	2	Geometry,	2
		Physics,	4	Physics,	4
		English,	5	Latin,	5
		Drawing,	5	Drawing,	5
	Spring.	Algebra,	2	Algebra,	2
		Geometry,	4	Geometry,	4
		Physical Geography,	5	Physical Geography,	5
		Botany,	4	Latin,	5
		Drawing,	5	Drawing,	5

The following list shows at a glance the leading departments of study:

1. AGRICULTURE (Three Courses) and AGRICULTURAL CHEMISTRY; with constant illustrations on the Farm and in the Laboratory.
2. BOTANY and HORTICULTURE; theoretical and practical. Students taught original study with the microscope.
3. CHEMISTRY; with an unusually full and thorough course in the Laboratory.
4. CIVIL AND MECHANICAL ENGINEERING; very extensive field and shop practice with best modern instruments.
5. HISTORY; Ancient and Modern, with original investigation.
6. LADIES' COURSE in LITERATURE and SCIENCE; two years. Ample facilities for Music, vocal and instrumental.
7. LANGUAGE and LITERATURE; Latin, (optional,) French, German, and English, (required,) one or more continued through the entire course.
8. MATHEMATICS and ASTRONOMY; pure and applied.
9. MECHANIC ARTS; combining shop-work with study—three years' course; new building and equipment.
10. MENTAL, MORAL and POLITICAL SCIENCE; Constitutional Law and History, Political Economy, &c.
11. MILITARY SCIENCE; instruction theoretical and practical, including each arm of the service.
12. PHYSICS; Sound, Light, Heat, Electricity, &c., a very full course, with *extensive Laboratory* practice.
13. PREPARATORY DEPARTMENT; Two years—carefully graded and thorough.

Fall term opens September 8, 1886; Winter term, January 5, 1887; Spring term, April 7, 1887.